April 26, 1943

# STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

Our Latest Contribution To The War Effort

VALLEY MOULD & IRON CORP.

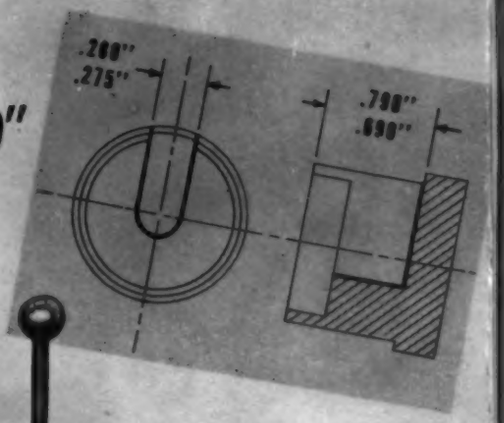
General Offices: HUBBARD, OHIO

Western Office: Chicago, Ill.

Northern Office: Cleveland, O.

# JUST 6 SECONDS

## To Finish a .280" x .690" Slot from the Solid

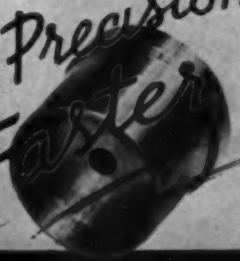


### Heald Bore-Matic *plus* Heald tooling boosts production to *600 per hour* on shell fuse parts

Finishing a slot .280" wide x .690" deep from the solid is ordinarily a comparatively slow process . . . too slow in fact to produce brass shell fuse parts requiring this operation in the huge quantities needed today. Heald field engineers when called in on the job recommended, not a battery of machines, but the single compact Heald Bore-Matic shown above. This Bore-Matic is a No. 49 machine, double-end, with six boring heads carrying end-mills and a six station fixture mounted on a hydraulic cross-slide used for feeding in a side cut. Three fuse parts are slotted simultaneously, three others being loaded meanwhile. Production is 600 per hour, entirely meeting the customers' requirements. Such high production is obtained with a standard Heald Bore-Matic, all units being standard with the exception of tools and fixture. And this job is not an isolated case. Every day Heald Engineering works out equally successful arrangements for getting out more work with more precision. Let's get to work now on your problems in precision boring, turning, facing, chamfering and grooving.

Write, phone or wire TECHNOLOGY DEPT.

*More Precision Faster*



**THE HEALD MACHINE CO.** *WORCESTER, MASS. U. S. A.*

MANUFACTURERS OF PRECISION BORING AND PRECISION GRINDING MACHINES

# How much critical Ni, V, Mo . . . is hidden in your "common" scrap?

Thousands of pounds of precious alloying metals, hidden away in common scrap, are every day charged in heats of plain carbon steel, and wasted.

Why does a steel-maker throw away such scarce and valuable material?

Don't blame the steel-maker! When scrap that is purchased as common scrap happens to contain alloying metals, the steel mills cannot make proper use of the alloy content, for it is hidden. And man-hours simply cannot be spared to comb through every part of every carload of scrap and make detailed check-ups, on the possibility of detecting hidden alloys.

Huge tonnages of alloy scrap are continuously circulating from airplane factories and tank arsenals to steel mills, then back again as new alloy steels. This revolving scrap pile is the nation's chief reserve of already-mined alloying metals, above the ground and ready to use.

But unless alloy scrap is classified right at the machine shop or forge where it is produced, unless alloy and common scrap are segregated, these alloying metals, needed so critically in the war effort, are lost for all time.

How important is this matter of alloy-scrap segregation? It is vital. This is an alloy-steel war. If you and we and everyone else ceased to classify alloy scrap, the country's production of fighting alloy steels would drop a calamitous 50 per cent.

That is reason enough, surely, why steel-makers are urging that every pound of alloy scrap be classified, so as to preserve its identity and make it available to help win the war.

BETHLEHEM STEEL

*The three suggestions that follow are heartily commended to anyone who wants to do his part to ease the present difficult alloy situation:*

**(1) Classify every pound of alloy steel scrap.**
**(2) Keep alloy and common scrap separated.**
**(3) Keep ferrous and non-ferrous scrap separated.**

***Our government has issued a classification list showing how alloy steel scrap should be segregated. In case you haven't a copy, let us send one to you. Write to Bethlehem Steel Company, Bethlehem, Pa.***

# UNITED'S

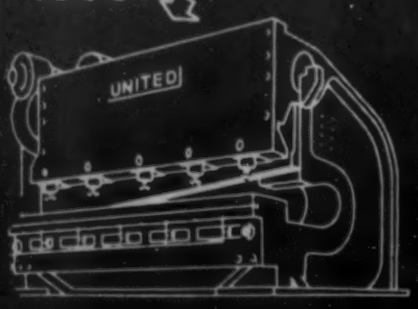
# *New* PLATE SHEAR

Fully Equipped to Shear Plates 3/16" to 2" thick.

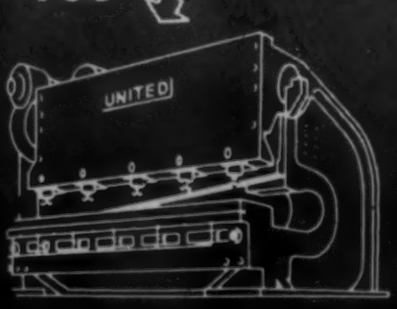
Cross Cutting or Slitting as desired.

## *in 8 sizes*

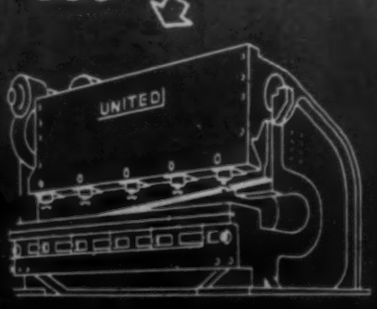
#1000



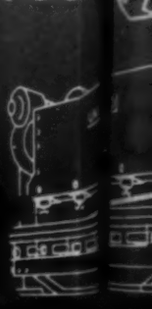

#900




#800




#700



**UNITED ENGINEERING and FOUNDRY COMPANY**

PITTSBURGH · PENNSYLVANIA

# BEHIND THE SCENES

## Report from the West

■ As we mentioned here several weeks ago, John Knox, steel plant editor, has been plying his way all through the wild and wooly west lining up some real first-hand information for you in future issues on what has already happened and what may be expected after the war "out thar". Here's a dispatch from John that should give you an inkling of what to expect:

**The further I travel along this picturesque Pacific Coast, the more I talk with bankers, chamber of commerce officials, steel manufacturers, fabricators and mill representatives, the more convincing it becomes that something is happening out here that never has happened before. The whole Pacific Coast is a beehive but not much smoke is belching from stacks of industrial plants for the simple reason that low-cost electric power from various hydroelectric plants has cleared the atmosphere. Giants long asleep in the mountains and hills of the Northwest are being aroused from their slumber by the sound of the guns booming in the Far East. Back in the hills of Washington and Oregon minerologists with pick and shovel are bringing into the open many metals which we thought had to be imported into this country. Metallurgists are looking into test tubes in the hope that Oregon silica sands may find their way into aluminum reduction furnaces instead of being shipped from Southern California. Millions of pounds of aluminum are being produced in pig form and shortly will be rolled into sheets on a continuous mill now under construction which resembles in many respects the 4-high continuous sheet mills back in the East. No longer will aluminum be shipped east in pig form to be rolled and then returned in sheet form to the west for fabrication.**

**The story of the west today is the story of shifting population; the story of shifting population is the story of new markets. The story of new markets is the story of new steel plants. And that is exactly what is taking place. An electric steel plant is under construction in Oregon; another is being considered by WPB for the same state at a cost of 25 millions. Plenty of virgin scrap and low cost power is the stimulant behind the western urge to make steel in its own backyard.**

**Further down the coast in the region of Los Angeles and San Francisco there is just as keen activity. Here again one encounters the large influx of folk from middle western states—not only an influx but a determination to make the coastal cities their permanent location. Say what you will, the climate and scenery are altering whatever plans these western folk have had for the future. Make no mistake, the Los Angeles-San Francisco area is buzzing and plans for the future are so visionary that one staggers at their proportions.**

**Everything has been done to provide suitable housing for the shifting population but the growth has been in such proportions that housing conditions still are inadequate in many of the industrial cities. Eventually this will be changed for everywhere the sound of the hammer and the saw is heard; piles of lumber are scattered over wide expanses; row after row of houses are taking shape; and soon grass seed will be scattered.**

**Time and time again in certain cities transportation facilities have been increased only to fall far short in the movement of the masses to and from work. Buses, street cars and private automobiles move workers to and from plants in masterly fashion though horns are used profusely and buses wend their way in and out of traffic that makes Fifth avenue look like a back alley.**

**Then there is the Kaiser steel plant now taking shape over in Fontana with its dynamic organization. So many false statements have been made concerning Kaiser's operation at Fontana that I was determined to look into every nook and corner—and mind you, with an open mind—in order to find out if the stories I heard back East were true. You can tell the boys back home that they have been greatly misinformed concerning this plant tucked away in 1300 acres of farm land. Such stories that the plant can't get a ladle crane, that the open hearth construction is being held up because of chrome brick shortage, that magnesium isn't being made, that too many minerologists are being employed, etc. are just so much idle talk.**

**Have it understood, and underscore what I am about to say: I am not trying to fight Kaiser's battle. I merely entered his plant with an unbiased mind. I saw every nook and corner. No question which I submitted was left unanswered by the Kaiser organization. Tell the boys back East for me that this plant at Fontana is a permanent fixture on the Pacific Coast. Tell them to be patient until I can get back to my desk and give them a story that will shake them out of their complacency. Tell them that I'll be facing my typewriter about the middle of May and that I intend to interpret in great detail the transformation that is taking place all along the Pacific Coast, the intensive thought that is being given to post-war conditions and a few untold details concerning Kaiser's steel plant and his organization —all first hand information gathered on a 7500-mile trip under adverse traveling conditions.**

**So long, for now. I'll be pulling in Cleveland in a few weeks with a loaded brief case and plenty of first-hand information.**

**J. D. Knox**

## Golf Rationing

■ One of the cleverest little pieces of promotion we've seen just hit our desk this morning from Struthers Dunn Inc., Philadelphia (Relays, Timers and Solenoids).

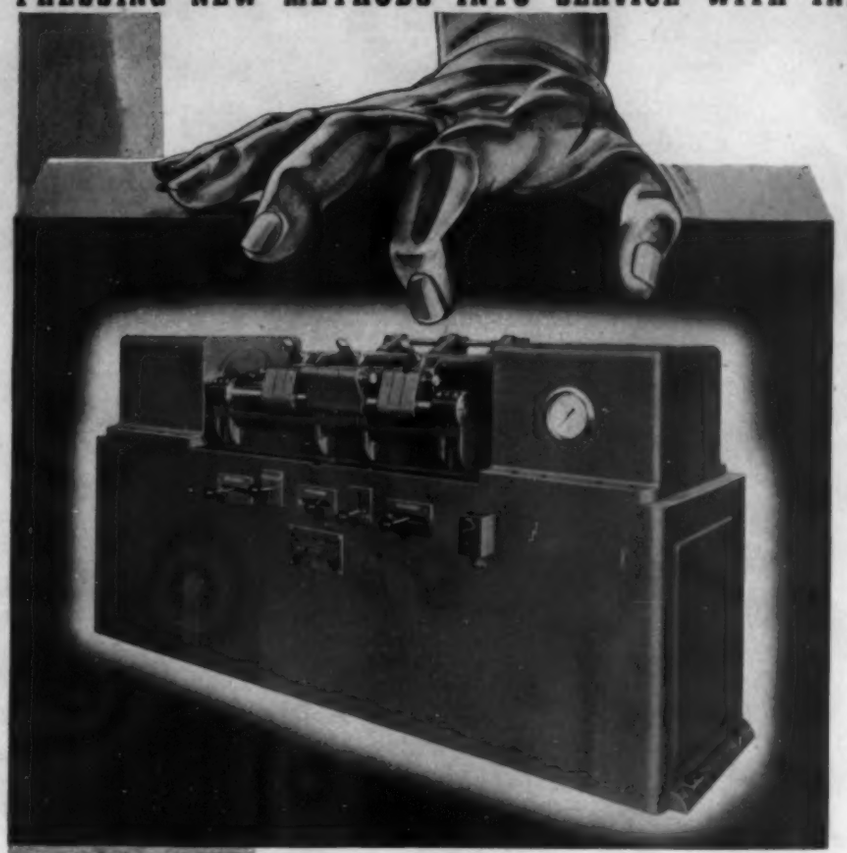
It is a "G" Basic Golf Ration Book, complete with a sticker for your car and eight different unit coupons entitling you to such things as "Bragging about the time you almost made a hole-in-one", "Playing the 19th hole", "Playing poker, bridge or craps", "Looking for lost balls", etc.

Instructions are to remove the proper coupon and paste it on the head of the nearest bald-headed man as a matter of record. No coupons are necessary for trips to the men's room, and coupons are not transferable but they tell us you can get all you want if you just drop a line to the company at 1321 Arch street, Philadelphia.

Vol. 112, No. 17, April 26, 1943, issue of STEEL, published every Monday at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00.

Editorial Contents—Page 43

PRESSING NEW METHODS INTO SERVICE WITH INDUSTRY'S NEW RIGHT HAND

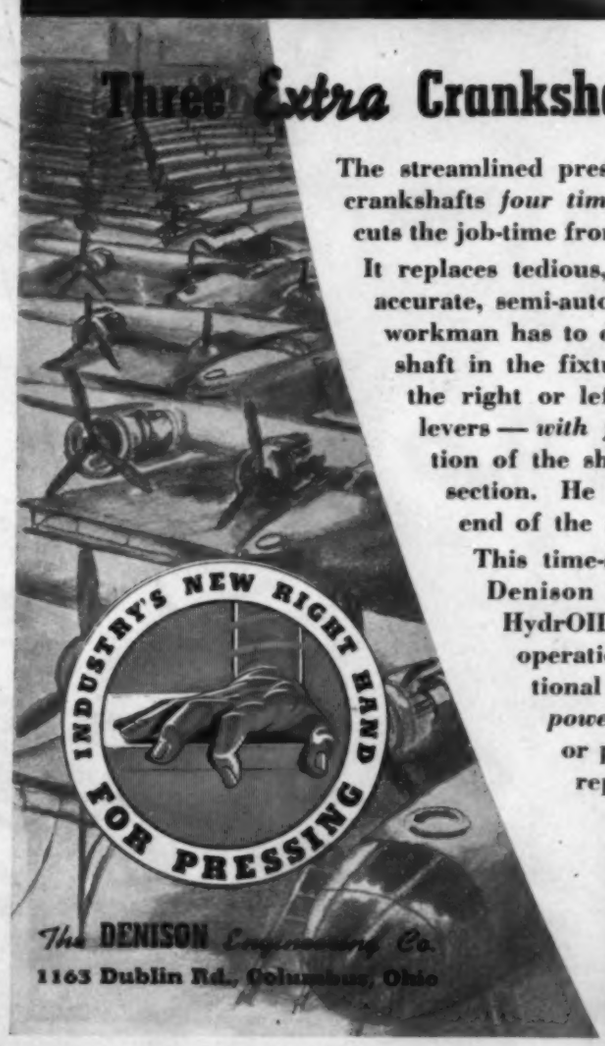


# Three *Extra* Crankshafts Every Ten Minutes

**The streamlined press shown above assembles airplane crankshafts *four times faster* than previous methods — cuts the job-time from *10* to 2½ minutes!**

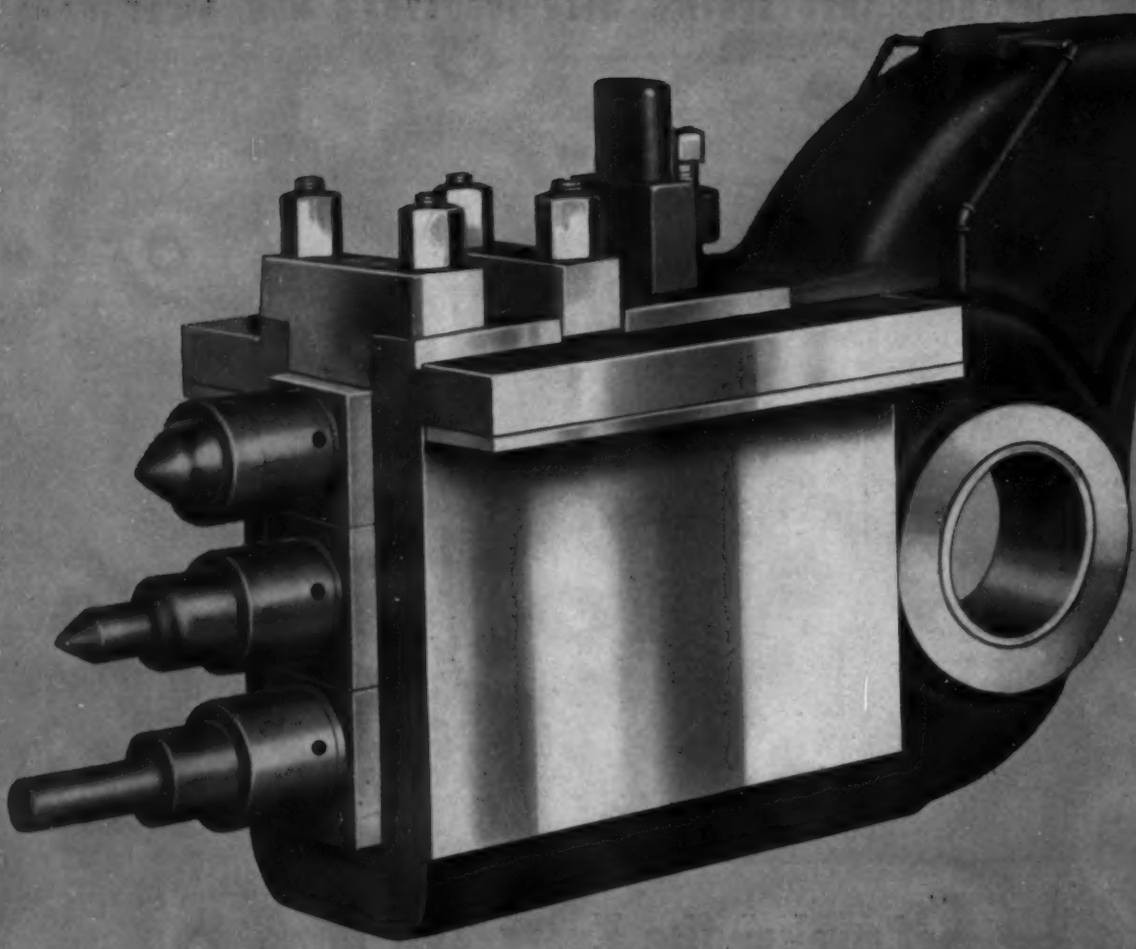
**It replaces tedious, painstaking hand labor with quick, accurate, semi-automatic *oil hydraulic* operation. All the workman has to do now is lock the three sections of the shaft in the fixture, and direct hydraulic fluid to either the right or left ram. Then by moving ram-operating levers — *with fingertip pressure control* — one end section of the shaft is assembled to the rigidly held center section. He then repeats the operation on the opposite end of the shaft.**

**This time-saving equipment is a good example of how Denison Engineers are tailoring the advantages of HydrOILics to a constantly expanding field of industrial operations. They will be glad to show you how the exceptional *smoothness, flexibility and accuracy* of oil hydraulic *power, speed, and control* can be applied to your products or production. Write or wire today, or call your Denison representative.**



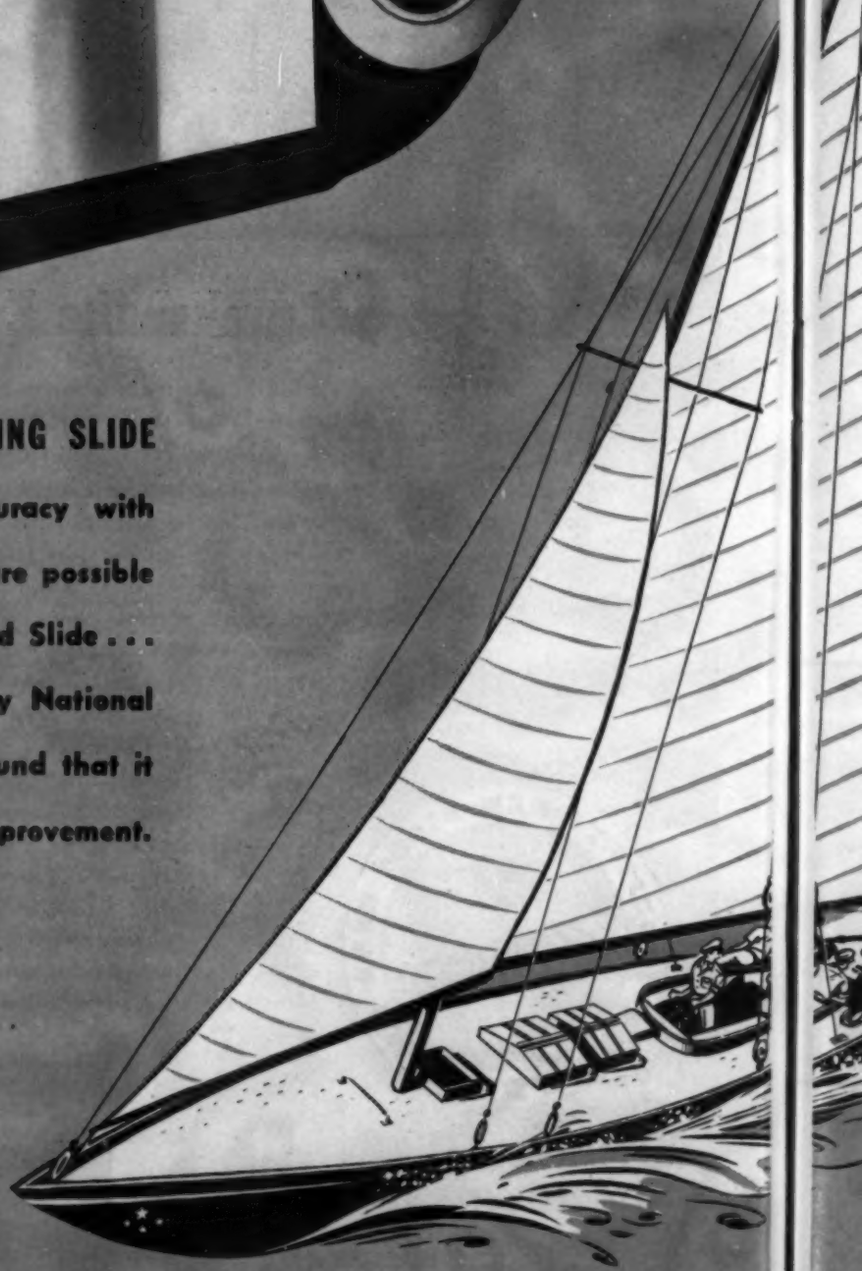

The DENISON Engineering Co.
1163 Dublin Rd., Columbus, Ohio

DENISON
EQUIPMENT in APPLIED
Hydr OIL ics



## EXTENDED PILOTED HEADING SLIDE

**Forgings to micrometer accuracy with holes ready for broaching are possible only because of this Extended Slide . . . originated and first used by National . . . a feature so basically sound that it has defied every effort at improvement.**



*Always First Across the Finish Line!*

**Not luck . . . but an ability to gauge machine forging needs with accuracy . . . is responsible for the fact that National's engineers have been "first to finish" with every major development in forging machine design.**

# NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO

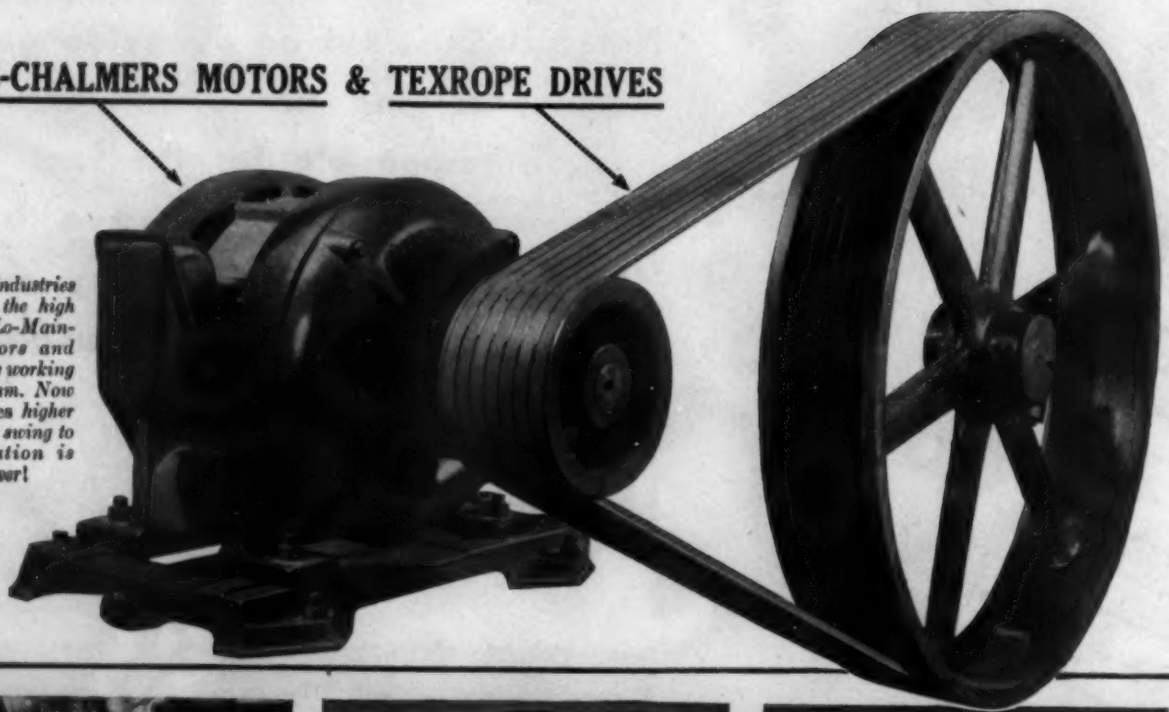



NATIONAL HIGH DUTY FORGING MACHINE — Built in 1-inch to 9-inch sizes.

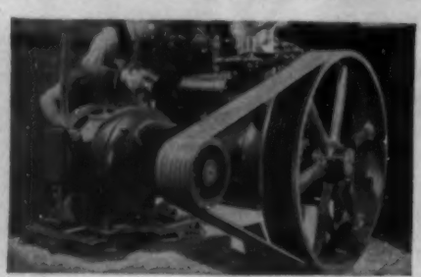
**IN PEACE AND WAR--**

# Give this an "E" for

**ALLIS-CHALMERS MOTORS & TEXROPE DRIVES**

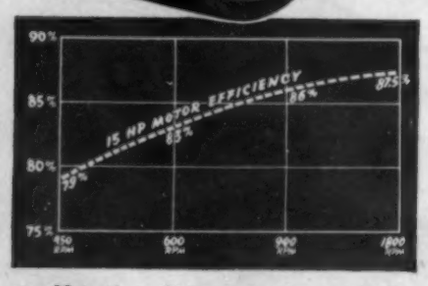


*Thousands of industries already know the high efficiency of Lo-Maintenance Motors and Texrope Drives working together as a team. Now that war forces higher efficiencies, the swing to this combination is stronger than ever!*



**1** In most applications, an 1800 rpm motor with Texrope Drive will ably do the job of a lower-speed, direct-connected motor —at lower cost in money *and materials!*

**2** When you buy an 1800 rpm instead of 450 rpm 15 hp squirrel-cage motor, for example, 600 lb are saved. And *you* save well over $200 — with drive figured in!




**3** Note that efficiency rises from 79% for the 450 rpm motor to 87.5% for the 1800 rpm motor. The 1800 rpm motor saves you over 30 kw/24 hr. day.

WE WORK FOR VICTORY — WE PLAN FOR PEACE

**ALLIS-**

**STEEL**

# Combination Efficiency!

**☛ Using high-speed motors with Allis-Chalmers Texrope Drives and single-speed motors with Allis-Chalmers Vari-Pitch Sheaves and Speed Changers has always been good practice. Today it's a vital practice!**

**☛ Such combinations give sharply higher efficiencies —at lower cost in man-hours, money and materials!**

**☛ As America's only builder of both motors and V-belt drives, Allis-Chalmers has long studied and advocated their use in proper combination.**

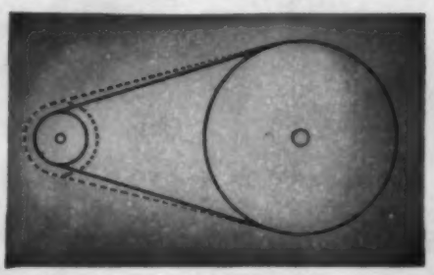
**☛ Today you benefit from Allis-Chalmers pioneering when you ask for—and get—the right combination of Lo-Maintenance Motor and Texrope Drive!**

BUILDING the largest variety of capital goods in the world, Allis-Chalmers know-how is in many ways unique — and is *completely* at the service of American war industry.

Allis-Chalmers, builder of Lo-Maintenance Motors, *originated* the multiple V-belt drive and Vari-Pitch Sheaves.

Today there's every patriotic *and business* reason for using material-saving, money-saving single speed and high-speed motors — made flexible and more efficient by Texrope Drives.

Don't hesitate to call on Allis-Chalmers district offices for engineering data or recommendations — or write direct to ALLIS-CHALMERS MFG. CO., MILWAUKEE, WISCONSIN. A 1581



**4** Infrequently needed speed changes can be had by changing from one size motor sheave to another. Juggling *complete* drives, range is 1:1 to 7:1.

**5** With the Allis-Chalmers Vari-Pitch Sheave, you can increase or decrease speed by adjusting sheave diameter . . . obtaining an *unbroken* series of speeds!

**6** Allis-Chalmers Vari-Pitch Speed Changer gives you infinite changes at the turn of a wheel — within 3.75 to 1. It's compact, flexible, *efficient!*

# CHALMERS

***LO-MAINTENANCE MOTORS***
***TEXROPE DRIVES***

# ...back from danger

Safe on the carrier's deck, the Wildcat returns from a mission of danger! The giant Wasp engine in its nose has roared it to Victory—and brought it back, safe.

The engineering problems represented by these 18 powerful cylinders are staggering. Take the matter of reduction gears alone. Stepping down the high speed of the whirling crankshaft to the necessary slower propeller revolutions requires gears of such light weight and such extreme precision that only a slight variation would quickly spell their destruction. And yet, the flow of engines coming off production lines to power the world's mightiest air armada demands that these gears be produced by the hundreds of thousands.

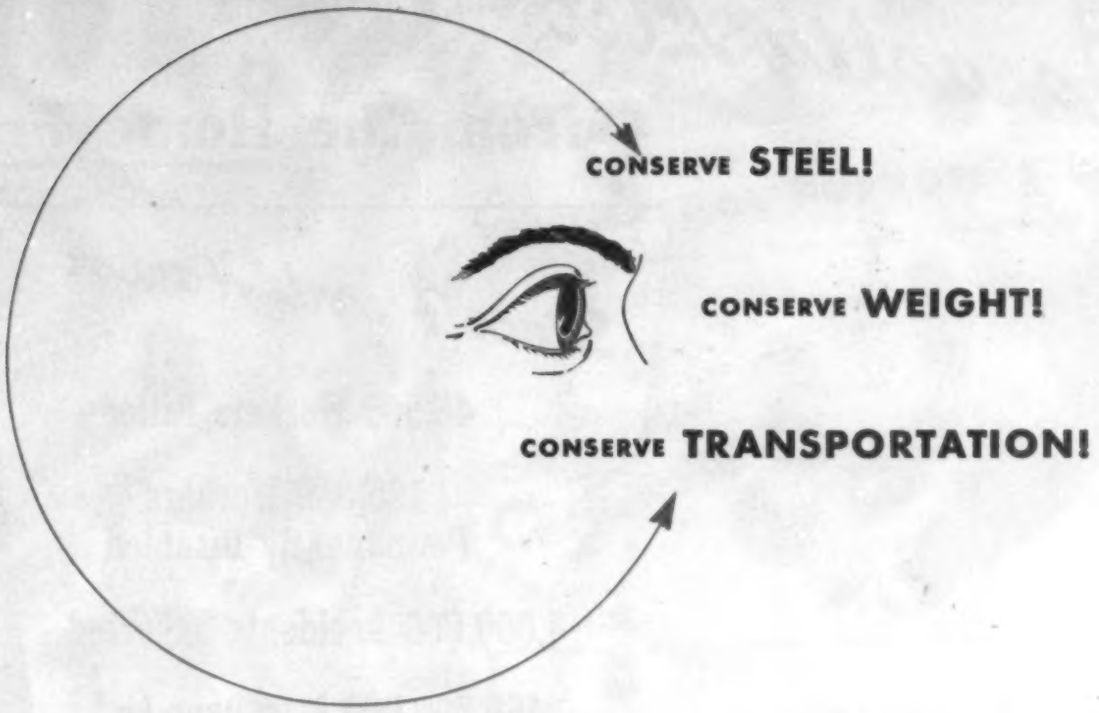
And making these gears is Foote Bros.' job—a job that only a few months ago was considered well nigh impossible. How new production techniques—new engineering developments—resulted in the present production that keeps three plants of Foote Bros. Gear and Machine Corporation busy cannot be revealed until the war is won. But when "V" Day comes, these manufacturing know-hows can be applied to the making of precision gears for any product where close tolerances can aid in securing better performance and greater economy.

FOOTE BROS. GEAR AND MACHINE CORPORATION • 5225 S. Western Boulevard, Chicago, Illinois

The Grumman Wildcat pictured here has been the Navy's first line fighter since Pearl Harbor. O'Hare, Thatch, Gayford and other Navy Aces became famous in the cockpit of this tough plane.

FOOTE BROS.

*Better Power Transmission Through Better Gears*




MAKE YOUR PRODUCT OF

# N-A-X

## HIGH TENSILE

When you build your product of N-A-X HIGH TENSILE you conserve 3 ways—you conserve steel, you conserve weight, and you conserve transportation.

With N-A-X HIGH TENSILE, you need less steel to provide a given strength factor. That saves steel! You can build lighter without any sacrifice of strength. That saves weight! And when you save weight you save transportation—and that's a vitally important factor today in speeding our war effort.

N-A-X HIGH TENSILE is the answer to many a production problem today. Its high ultimate strength, high yield point, unusual ductility, easy weldability, and its unusually high resistance to impact and fatigue in sub zero cold or blistering heat—makes N-A-X HIGH TENSILE a superior steel for hundreds of exacting applications.

Why not investigate N-A-X HIGH TENSILE for your product? A Great Lakes Engineer will be glad to show you how this unusual steel can be used to advantage. Send for new booklet on N-A-X 9100 Series—and useful Hardenability Chart.

DUCTILITY
ITS INHERENTLY FINER GRAIN MAKES ALL THE DIFFERENCE
STRENGTH

**GREAT LAKES STEEL CORPORATION**
**Detroit, Michigan**
*Sales Offices in Principal Cities*

NATIONAL STEEL

*Division of*
**NATIONAL STEEL CORPORATION**
*Executive Offices · Pittsburgh, Pa.*

# Casualty List from the Home Front

## Since Pearl Harbor:

**46,500 Workers Killed**

**165,000 Workers Permanently Disabled**

**4,000,000 Accidents Reported**

**450,000,000 Man-Days Lost Due to Accidents**

So far in this war, "accidents"—both on and off the job—have proven a more devastating enemy than the Nazis and Japs combined. Government figures show that, since the start of the war, there have been many more casualties—both killed and injured—among American industrial workers than the total military casualties of all our armed forces.

Every day since Pearl Harbor, over 11,000 war workers have been killed or injured—on or off the job. And the tragedy of it is that most of these accidents could and *should* have been prevented.

What can we do to stop this appalling loss of manpower? The National Safety Council has proved time after time that accident rates *can* be cut—*50 per cent and more*, in factories and industrial communities that use its preventive measures.

SAVE **Manpower** for **Warpower**

The Birdsboro Steel Foundry and Machine Company has for years conducted prevention campaigns to cut down accidents on the job, in the home and on the highway. In addition we have now joined in the nation-wide accident-prevention campaign being conducted by the War Production Fund to Conserve Manpower.

This campaign—instituted by American industry, with the endorsement of the President and the War Production Board—is being conducted to help facilitate a vastly expanded program of the National Safety Council for the protection of American war workers.

The War Production Fund offers the management of American business an opportunity to be of *practical* help in the vital task of stamping out industrial accidents. Full information can be obtained from the address below.

*For further information, write to*

**War Production Fund to Conserve Manpower**

*Chrysler Building, New York, N. Y. LExington 2-0280*

*William A. Irvin, National Chairman*

**BIRDSBORO STEEL FOUNDRY AND MACHINE CO., BIRDSBORO, PA.**

# Call us

## for GENERAL PURPOSE STEELS

**Steel products, tools, machinery and equipment**

Like yours, our first job is to speed war production. So, if your production on a war job is in danger of being slowed down for want of some piece of steel—call our nearest warehouse. Many such calls have kept wheels turning.

Although our stocks are not what we wish they were, what we have can be yours—in a hurry—subject, of course, to priority restrictions.

If we don't have what you need, we'll do everything we can to help you find a source of supply. So try us—note our phone and teletype numbers below, at the left.

## for NATIONAL EMERGENCY ALLOY STEELS

These new alloy steels were developed as substitutes for the old style alloy steels to save critical materials such as nickel and chromium. They cover a wide range of properties—were especially designed to meet present conditions. In fact, many "NE" steels are actually out-performing the steels previously used.

We welcome your inquiries and will gladly assist you in determining the grades best suited to your needs. Telephone, write or wire the warehouse nearest you.

## for AIRPLANE MATERIALS

Our Chicago Warehouse has been designated by the War Production Board as a warehouse to distribute the following aircraft products:

**WD-X-4130 Sheets,** *Open Hearth, Normalized, Pickled and Oiled to Spec. AN-QQ-S-685, Condition N. All gauges .016 to .50 sheets 18 x 72".*

**Stainless Steel Rounds,** *Spec. AN-QQ-S-771.*

**Stainless Sheets**—*Spec. AN-QQ-S-772. Spec. AN-QQ-S-757.*

These materials are for use in airplanes and available at our Chicago Warehouse only. If you are eligible for these materials, phone, write or wire: United States Steel Supply Company, P. O. Box MM, Chicago, Ill. Telephone, BRUnswick 2000—Teletype CG. 605.

UNITED STATES STEEL SUPPLY COMPANY

USS STEELS

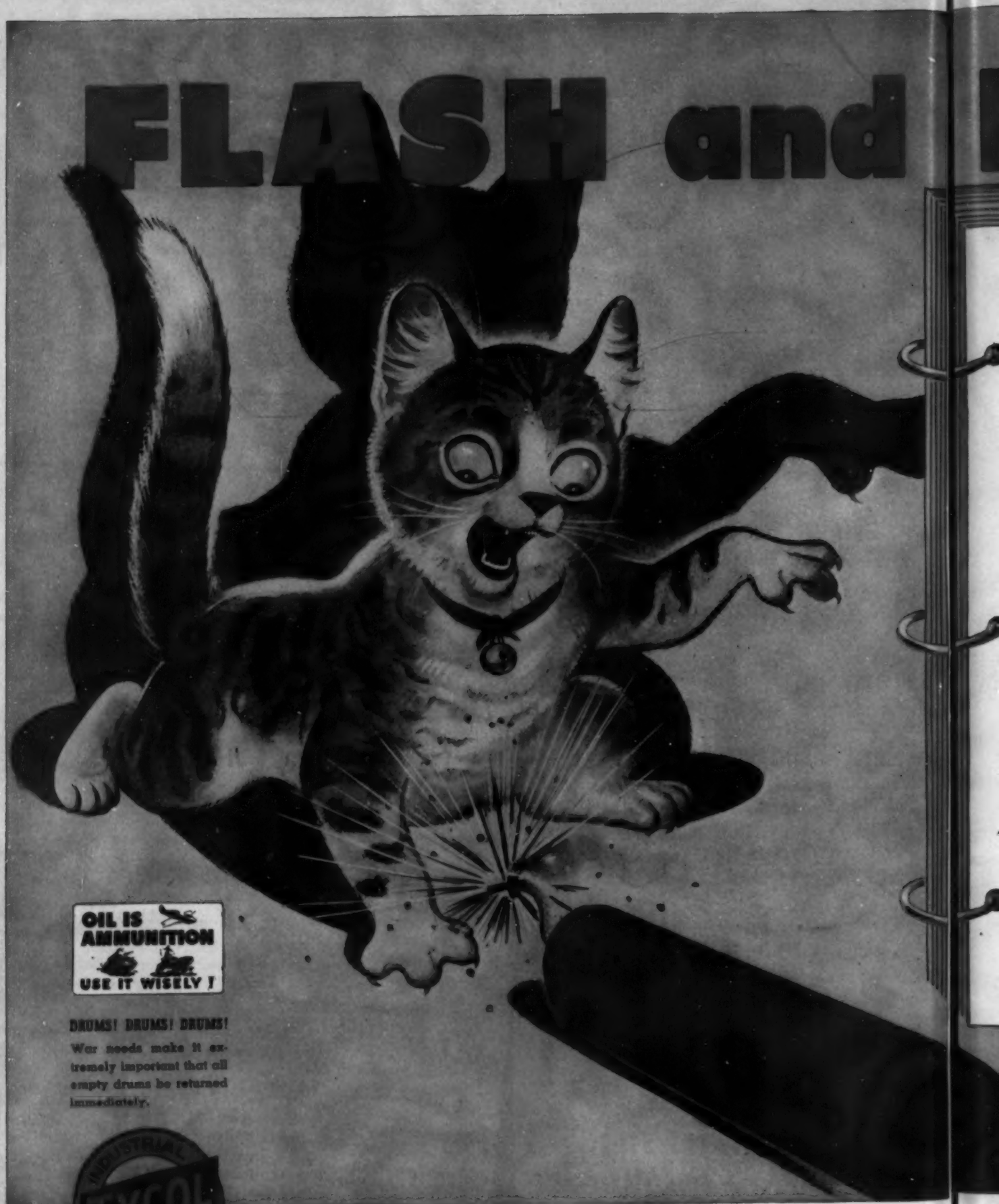
SERVICE

| | | |
|---|---|---|
| CHICAGO, | 1319 Wabansia Ave., P. O. Box MM | BRUnswick 2000 *Teletype CG. 605* |
| BALTIMORE, | Bush & Wicomico Sts., | GILmore 3100 |
| BOSTON, | 176 Lincoln St., Allston, P. O. Box 42 | STAdium 9400 *Teletype BRTN. 10* |
| CLEVELAND, | 1394 E. 39th St., | HEnderson 5750 *Teletype CV: 153* |
| NEWARK, N.J., | Foot of Bessemer St., P. O. Box 479 | Bigelow 3-5920 REctor 2-6560 *Teletype NK. 74* BErgen 3-1614 |
| PITTSBURGH, | 1281 Reedsdale St., N.S., | CEdar 7780 *Teletype PG. 475* |
| ST. LOUIS, | 21st & Gratiot Sts., | MAin 5235 *Teletype SL. 384* |
| TWIN CITY, | University Ave. and Eustis St., St. Paul, Minn. | NEstor 2821 *Teletype STP. 154* |

**UNITED STATES STEEL SUPPLY COMPANY**

*(formerly Scully Steel Products Company)*

UNITED STATES STEEL




SCIENTIFICALLY ENGINEERED
FOR EVERY INDUSTRIAL USE

**TYCOL**
STEEL

# FIRE

This is #2 of a series of informative messages concerning the meaning and significance of commonly used tests and terms employed to describe the characteristics of lubricating oils.

TIDEWATER LUBRICANIA

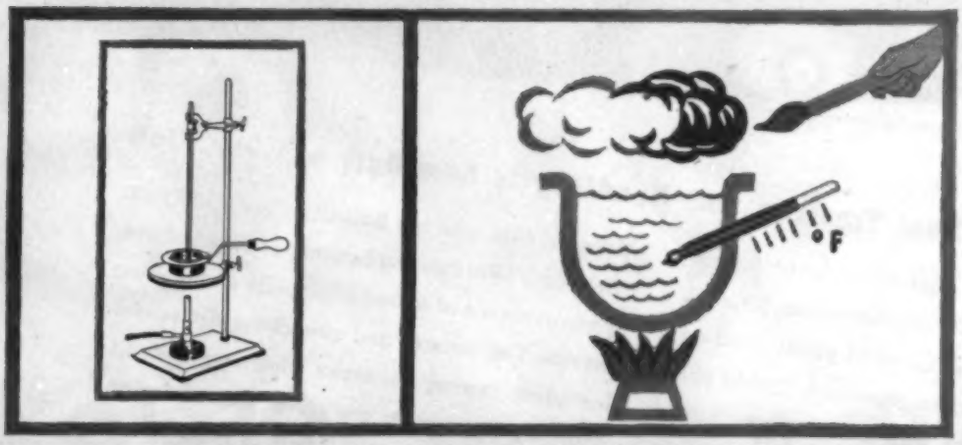
**DEFINITION:** That temperature at which a lubricating oil will first give off sufficient vapors to ignite when approached by a small flame or spark is termed the flash point—the lowest temperature at which when ignited, the oil continues to burn is called the fire point.

**TEST:** The flash point and the fire point of lubricating oil are usually determined by means of the Cleveland Open Cut Tester by following a definitely prescribed procedure. The oil under test is heated and a small pilot flame is moved over the cup with every 5°F rise in oil temperature. The first time a flash occurs on the surface of the oil, the temperature of the oil is recorded as the flash point. If the oil is heated still further and tested with the pilot flame, it will commence to burn with a continuous flame. When this occurs the oil temperature is recorded as the fire point.

For most purposes knowledge of the Flash Point alone is sufficient. It indicates the ordinary fire hazard in handling petroleum fuels and similar volatile products. With lubricating oils, Flash Points sufficiently high to avoid undue evaporation losses in service are definitely required.

The following illustrates examples of flash points of typical petroleum products, fire points being somewhat higher:

| | |
|---|---|
| Gasoline .....below 0°F | Kerosene .....115-150°F |
| Cleaning Naptha ....110-115°F | Light Machine Oil....325-400°F |
| Heavy Cylinder Oil..525-625°F | |




Tycol lubricants are subject to rigid flash point control during manufacture. Uniformly correct flash points, insuring undiluted products in every grade, are one of many Tycol characteristics contributing to high quality.

## TIDE WATER ASSOCIATED OIL COMPANY

Eastern Division: 17 Battery Place, New York • *Principal Branch Offices:* Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL

# INDUSTRIAL LUBRICANTS

# Salem's Ingenuity Applies to Furnaces And Auxiliary Handling Equipment

## Example, Bomb Heat Treating and Handling is Now Only a 3 Man Job

● The outstanding performance of Salem furnaces may well be attributed to Salem's experience and knowledge of plant production operations. Salem, therefore, builds and designs furnaces as well as auxiliary handling machinery, which co-ordinates the operations of all equipment to speed production and lower costs. With this thorough understanding of manufacturing procedure, Salem engineers can also offer dependable furnace designs which will dovetail into existing handling mechanisms. The bomb heat treating furnace, pictured above, gives evidence of Salem's complete engineering service. The furnace and quenching equipment, including conveyors, racks, charging and discharging apparatus, are all of Salem design. This war equipment . . . big and important as it is . . . requires only THREE MEN for operating as well as supervision. Write to Salem about your problem—use Salem's experience in war production equipment.

SALEM ENGINEERING COMPANY

# SALEM ENGINEERING CO. . . SALEM, OHIO

# Here's a screw driver bit that has

# more lives

## than a cat

Apex Phillips Power Bits do wear out eventually, but Apex Reconditioning Service gives them many lives.

When you have Apex-Phillips Bits reconditioned, you not only save important money, but you help our War Effort by conserving a vitally critical material . . . Tool Steel.

Do not scrap your worn out Phillips Bits—send them to us for reconditioning. They will be returned promptly, just as good as new bits.

When you buy Apex-Phillips Bits and use Apex Reconditioning Service you can then be sure your tool cost per thousand screws driven is down to rock bottom.

Write for Catalog #15 for complete information.

# APEX

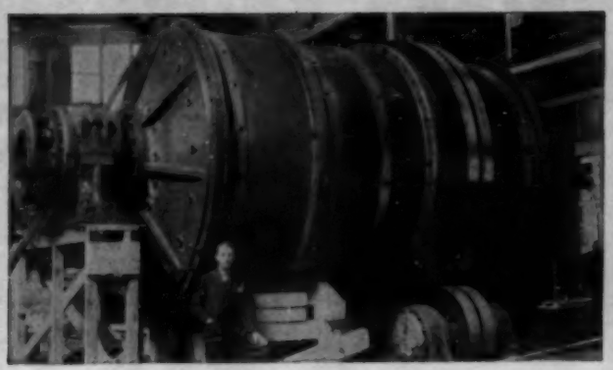
**THE APEX MACHINE & TOOL CO., DAYTON, OHIO**

Manufacturers of Power Bits for Phillips, Slotted Head, and Clutch Head Screws; and Hand Tools for Phillips and Clutch Head Screws.

Phillips Bit Reconditioning Service for the Pacific Coast at the Burklyn Co., 3429 Glendale Blvd., Los Angeles, Calif.

### *Meehanite Foundries*

Allentown, Pa.
**Traylor Engineering Company**
Ansonia, Conn.
**Farrel-Birmingham Co., Inc.**
Bridgewater, Mass.
**The Henry Perkins Co.**
Brooklyn, New York
**E. W. Bliss Company**
Buffalo, N. Y.
**Pohlman Foundry Co., Inc.**
Charleston, W. Va.
**Kanawha Manufacturing Co.**
Chattanooga, Tenn.
**Ross-Meehan Foundries**
Chicago, Ill.
**Greenlee Foundry Company**
Cincinnati, Ohio
**Cincinnati Grinders Incorporated**
**The Cincinnati Milling Machine Co.**
Cleveland, Ohio
**Fulton Foundry & Machine Co.**
Denver, Colo.
**The Stearns-Roger Mfg. Co.**
Detroit, Mich.
**Atlas Foundry Co.**
Flint, Mich.
**General Foundry & Mfg. Company**
Hamilton, Ohio
**The Hamilton Foundry & Machine Co.**
Hamilton, Ontario, Canada
**Otis-Fensom Elevator Company**
Irvington, N. J.
**Barnett Foundry & Machine Co.**
Jeannette, Pa.
**Elliott Company**
Lewisburg, Tenn.
**Marshall Stove Company**
Los Angeles, Calif.
**Kinney Iron Works**
Milwaukee, Wis.
**Koehring Company**
Mt. Vernon, O., Grove City, Pa.
**Cooper-Bessemer Corporation**
New Rochelle, N. Y.
**Meehanite Metal Corporation**
New York, N. Y.
**The American Brake Shoe & Foundry Co.**
Oakland, Calif.
**Vulcan Foundry Company**
Orillia, Canada
**E. Long, Ltd.**
Philadelphia, Pa.
**H. W. Butterworth & Sons Co.**
**Florence Pipe Foundry & Machine Co.,**
**(R. D. Wood Company, Selling Agents)**
Phillipsburg, N. J.
**Warren Foundry & Pipe Corp.**
Pittsburgh, Pa.
**Rosedale Foundry & Machine Co.**
Rochester, N. Y.
**American Laundry Machinery Co.**
St. Louis, Mo.
**Banner Iron Works**
St. Paul, Minn.
**Valley Iron Works**
London, Eng.
**The International Meehanite Metal Co., Ltd.**
Waterloo, N. S. W.
**Australian Meehanite Metal Co., Ltd.**
Johannesburg, South Africa
**Meehanite Metal Co. (S.A.) (Pty.) Ltd.**



This 9 foot x 12 foot Marcy Mill, cast in Meehanite, carries a ball load of 50 tons. Weight on each trunnion—70 tons.

# Meehanite WEAR-RESISTING CASTINGS

ARE TOUGH • SOLID • UNIFORM

One of Meehanite's outstanding fields of service is in Wear-Resisting applications. Meehanite castings are a particularly good choice for many such jobs, because their wear-resisting properties can be combined with other desirable features such as high strength, vibration absorption, self lubricating properties, easy machinability, and dependably uniform density and solidity.

## 5 DIFFERENT WEAR-RESISTING TYPES

Meehanite castings are available in five distinct Wear-Resisting types. Several types are needed because the properties required for various applications change with the type of service. Certain Stamping Dies, for example, might require very different metallurgical characteristics than truck brake drums. In the various types of Meehanite you can obtain: a tough, dense cast metal of high endurance limit; or castings, which when heat treated are file hard and have good anti-friction qualities; or a material particularly suited for ordinary abrasion resistance; or a casting chilled to a hard surface and tough back; or an extremely hard material for resisting the abrasive action of granite, carborundum, coke, etc.

## METALLURGICAL CONTROL ASSURES DEPENDABILITY

The strict control of physical properties, a dominant characteristic of the Meehanite manufacturing processes, gives you the type of Meehanite best suited to your particular needs. The nearest Meehanite foundry will gladly give you full information on Wear-Resisting or other types of Meehanite castings.

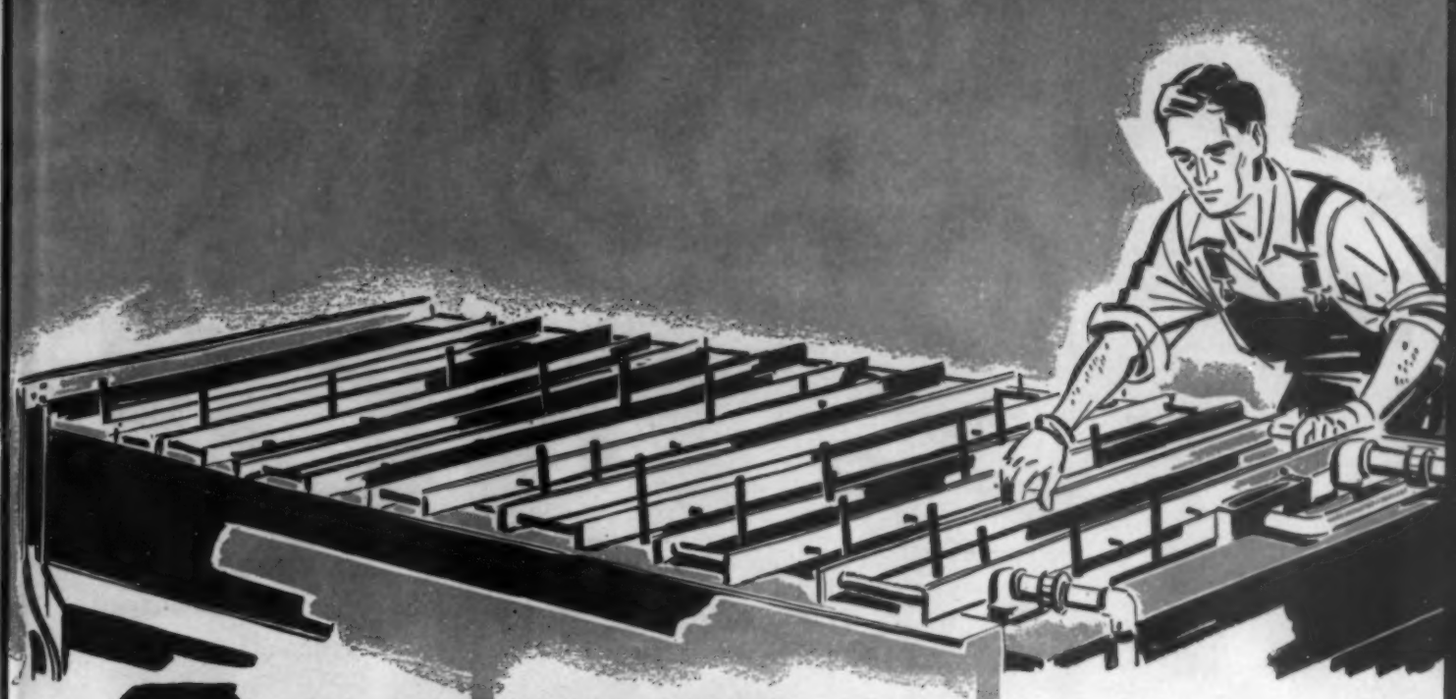
**MEEHANITE RESEARCH INSTITUTE • New Rochelle, N. Y.**

MEEHANITE

SEND FOR BOOKLET

Engineering Data Book, free to executives, engineers, designers, production men. Price to others, $1.00 per copy.

# TO SAVE TIME, LABOR, METAL



# -7 ANSWERS to your insulation and protective problems

### ☆ UNICHROME "AIR DRY" RACK COATING

—a tough, easy-to-use rack insulation that saves frequent recoating—withstands hot alkaline cleaners, acid dips, hard chromium solutions and chromic or sulphuric anodizing baths.

### ☆ UNICHROME "QUICK DRY" STOP-OFF 322

—a fast-drying, resistant lacquer that speeds preparation and handling—specially compounded for cyanide copper, chromium and other plating work requiring an extremely adherent stop-off.

### ☆ UNICHROME "QUICK DRY" STOP-OFF 323

—a fast-drying, resistant lacquer that speeds preparation and handling—specially compounded for Parkerizing, chromium and other plating work requiring a stop-off that can be peeled off after use.

### ☆ UNICHROME RESIST SHEET AND ROD

—a solid insulating material that is readily fabricated and extremely resistant to all plating room chemicals—specially suitable for constructing composite plating racks, stop-off shields, insulating gaskets and lattices for preventing short circuits in anodizing tanks.

### ☆ UNICHROME STOP-OFF COMPOUND 311

—a solid, wax-like formulation that saves preparation time in stopping off complicated shapes—suitable for work requiring resistance to boiling hot cleaners, acid dips and high temperature plating solutions.

### ☆ UNICHROME RESIST LACQUER BG

—a heavy-bodied, resilient insulating lacquer that has excellent all-round chemical resistance — specially suitable for hard chromium and Parkerizing work requiring a stop-off that can be peeled off after use.

### ☆ UCILON

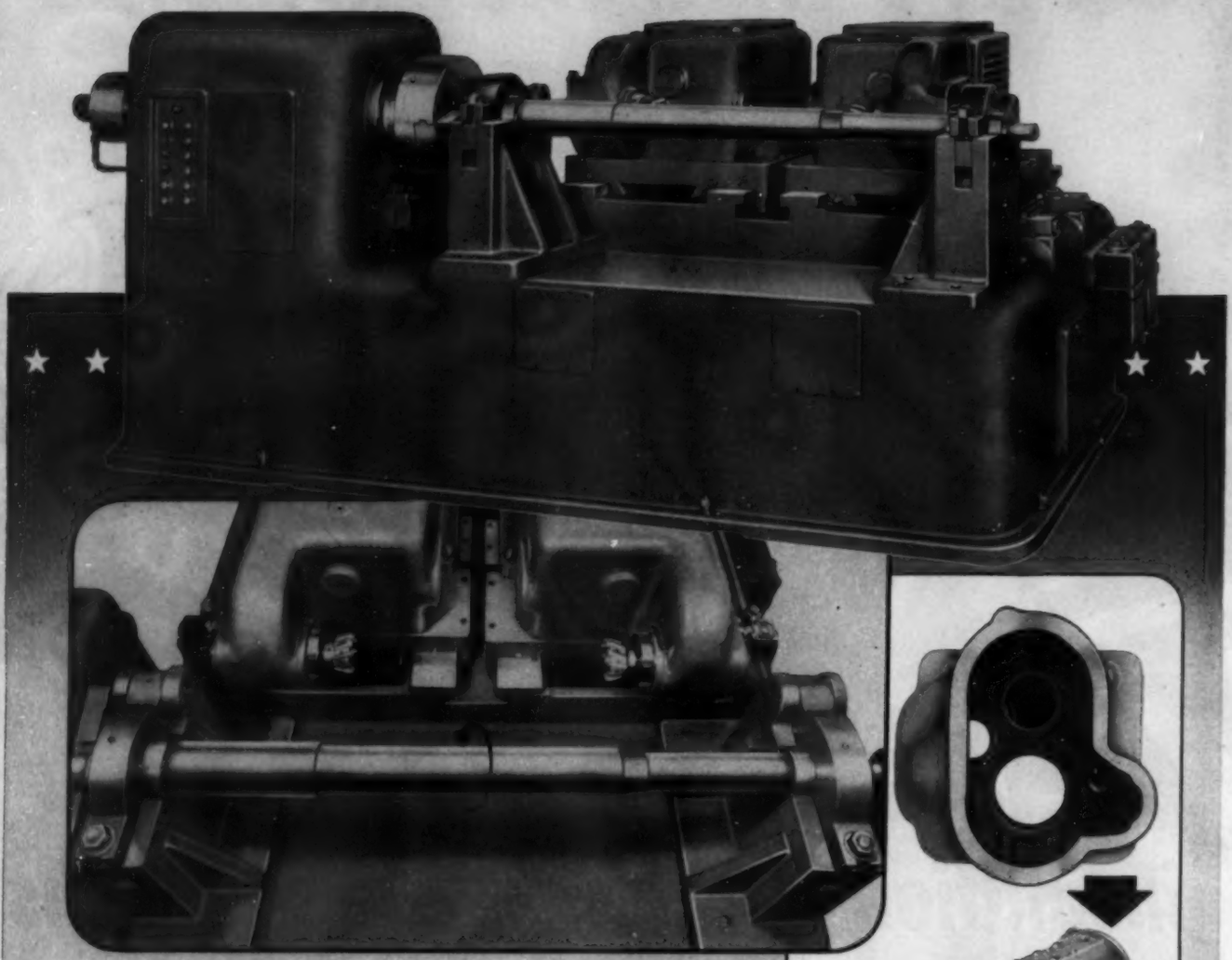
—an air-drying protective coating that is remarkably resistant to the action of both acids and alkalies, salts, cleaning compounds, oxidants and moisture — specially suitable for painting on ducts, equipment and other metal, wood, or concrete surfaces exposed to corrosion.

### FOR FURTHER DETAILS

or an initial order, write briefly stating your problem and the work for which the insulation is intended.

*☆Trade mark Reg.U.S. Pat.Off.*

**UNITED CHROMIUM**
INCORPORATED
51 East 42nd St, New York, N.Y.
Waterbury, Conn. ☆ Detroit, Mich.

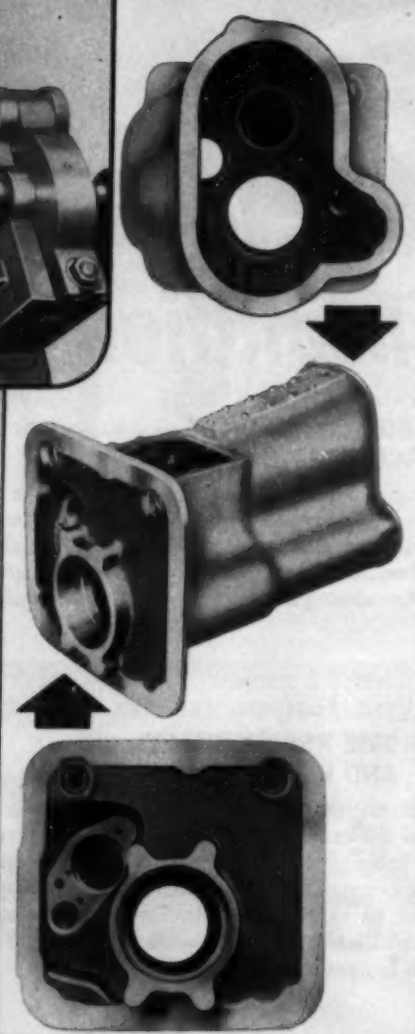


## CROSS DESIGNS AND BUILDS

# *Special Machinery*

Solving this unusual and difficult manufacturing problem has attracted the widespread attention of production engineers. The work is mounted on an arbor and revolved at a feeding rate while both ends, although dissimilar in shape and contour, are milled simultaneously to assure exact parallelism and squareness with the bore. The automatic operating cycle is controlled from a centralized push button station and excellent results are secured with unskilled labor.

A review of your manufacturing practice will reveal many opportunities to consolidate operations and put them on an automatic basis with improved accuracy and reduced manpower. Cross engineers are prepared to assist you in applying special machinery to your manufacturing problems.



*On the cast iron gear box illustrated above both ends, each entirely different from the other, are automatically finished at the same time and in one operation.*

**CROSS GEAR & MACHINE CO.**

*Established in 1898*

DETROIT, MICHIGAN, U.S.A.

S-4

# Extensive facilities available for metal stamping, fabricating and finishing

McKINNEY MANUFACTURING COMPANY—manufacturers in steel for 78 years has large capacity available for stamping, fabricating and finishing 3 to 20 gage metal.

Facilities for sub-contract work include—

500 machines from 10 to 150 ton capacity
with 2-inch to 6-inch stroke for
blanking and forming,
drilling and countersinking,
wire heading,
milling.

Also large capacity for barrel and tank electro-plating, Bonderizing, Japanning, Sherardizing, paint and lacquer finishing.

McKINNEY *will not* hold up your production line.

Write, wire or phone McKinney Manufacturing Company, War Contract Division, No. 2, 1400 Metropolitan Street, Pittsburgh, Pa.

# Giving "BIG BOYS" and "LITTLE TOUGHIES" the innards to haul the heaviest loads in history

**NATIONAL SEAMLESS**
*Pipe and Tubing*

WALLS WITHOUT WELDS

**First American War Locomotives to reach Europe.** Small in comparison to some of the big locomotives shown here, but they are "army mules" for work. Designed for rough handling and a minimum of repairs. NATIONAL Seamless Tubes used in these locomotives.

**From Harrisburg to Chicago** with one stop for fuel. These new passenger locomotives are designed for long, fast runs pulling extremely heavy trains. They, too, use NATIONAL Seamless tubes for utmost reliability.

UNITED

**Over the great divide.** It takes plenty of "umph" to haul long, heavy freights over the Rockies, but these "Big Boys" have the innards to do the job. They use NATIONAL Seamless Boiler Tubes.

IN 1942, American railroads broke all existing records for passenger traffic and freight haulage. Ten months after Pearl Harbor they had hauled *four times* as many troops as they did in the same period of time in World War I. Freight haulage in the first eight months of 1942 jumped 36% in revenue-ton-miles over the same period in 1941. Passenger miles skyrocketed 61%. The estimated total for the whole year is 50 billion passenger miles—the highest total in history!

But these records are expected to be broken again in 1943—for the big push is yet to come. The railroads have shared, too, some of the war burdens of tankers and cargo vessels, helping to move greater quantities of oil, minerals, iron ore, coal and hundreds of other products.

With such a huge task ahead it is obvious that every locomotive will be needed in service every hour possible. Fortunately, many railroads and locomotive builders wisely installed tough, durable, long-lasting NATIONAL Seamless Boiler Tubes and some are getting from 65% to 100% longer service from these tubes. NATIONAL Seamless Pipe has likewise been the dominant choice for the intricate piping systems in most of the finer and larger locomotives and here, too, dependable quality has paid big dividends, especially since the heavy burden of war demands came along.

For hauling the "heavy stuff" railroads have reached a remarkable efficiency. To them belongs unmeasured credit for delivering so much so fast.

# NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* United States Steel Export Company, New York

**STATES STEEL**

# IF THESE WORKERS "Fumble" YOUR MACHINES STAND IDLE

These swinging racks give ready access to reamers, maximum protection to each tool. Quick identification even for inexperienced help is assured by prominent labels in front. *Photo courtesy General Electric Co.*

Prominent numbering of the receptacles for small taps and plug and ring gages makes for speedy handling, minimum delay at the tool crib window in this efficient crib arrangement. *Photo courtesy General Electric Co.*

Installed for temporary storage of small items, these oblong cans have given very satisfactory service. Composition containers might well be substituted if metal ones are not available. *Photo courtesy Brewster Aeronautical Corp.*

EVERY needless minute your costly machines stand idle between jobs means less production for you — and a longer war for all of us.

The photographs here may show you the way to an important saving. For each shows an arrangement that gets tools on the job with no waste of those precious minutes.

No one of these arrangements may fit *your* shop . . . but that's not the point. They may suggest a method adaptable to your requirements.

In checking your tool storage methods, keep these three fundamentals in mind:

1. A place for every tool, with a record to show its disposition when it's out.
2. An easily read and systematic means of identification.
3. Ample protection for keen cutting edges.

There are few places in your plant where careful planning will pay you more than your tool crib.

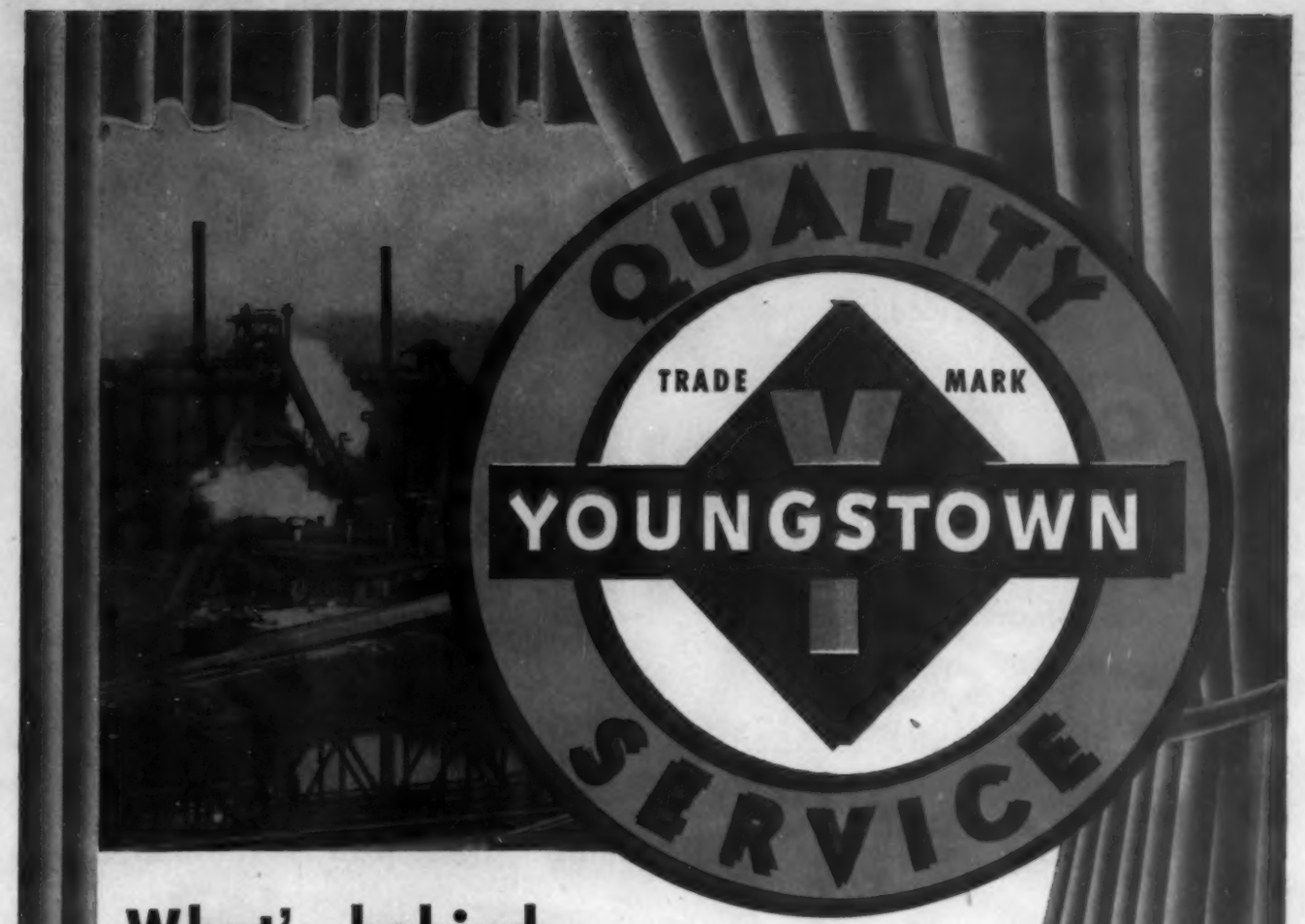
GTD GREENFIELD

TAPS · · · DIES · · · GAGES · · · TWIST DRILLS · · · SCREW PLATES

ARMY E NAVY

**GREENFIELD TAP AND DIE CORPORATION**
GREENFIELD, MASSACHUSETTS
DETROIT PLANT: 5850 Second Boulevard
WAREHOUSES in New York, Chicago and Los Angeles
In Canada:
GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

*Tool Conservation Begins in the Tool Crib*




# What's behind the TRADE MARK?

BEHIND the trade mark of The Youngstown Sheet and Tube Company is an interesting story. Founded in 1900, its career is a typical American achievement, representing 43 years of steady, substantial growth. As the original plans of its founders have gradually unfolded, Youngstown has been permitted to make material contributions to the welfare of the nation.

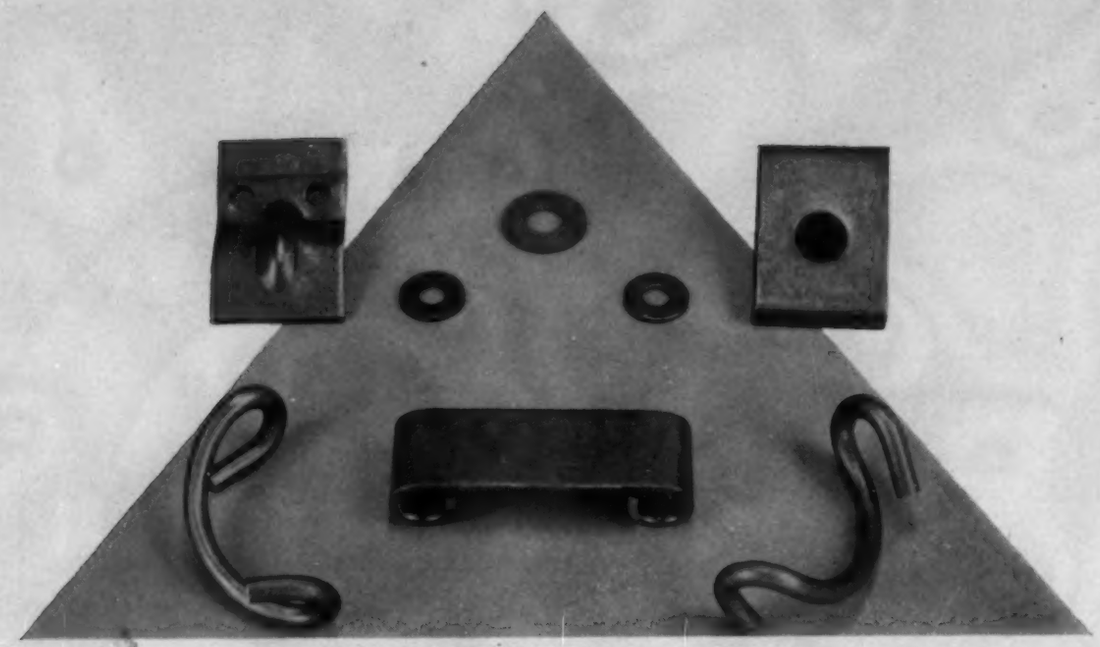
Integrity of purpose, courage, ability, a spirit of venture, the will to serve its customers—these are some of the things that give life and substance to the Youngstown trade mark. They have built the company from its small beginning with only a few thousand tons capacity to a position among the leaders in 1943—with an annual capacity of 4,000,000 tons of steel.

We here at Youngstown are devoting our energies 100% to meeting the emergencies of war now as we did in World War I. When peace comes, we shall devote all our resources to the requirements of our thousands of customers old and new.

**The YOUNGSTOWN**
**SHEET AND TUBE COMPANY,** *Youngstown, Ohio*
Manufacturers of
CARBON · ALLOY AND YOLOY STEELS

Pipe and Tubular Products • Sheets
Plates • Conduit • Bars • Tin Plate
Rods • Wire • Nails • Tie Plates and
Spikes • Alloy and Yoloy Steels

25-47F



POLE LINE HARDWARE WITH HOT-DIP LEAD COATING

# U. S. GOVERNMENT PIG LEAD AND METALLIC ANTIMONY STOCKS CONSTITUTE A SECOND LINE OF DEFENSE AGAINST SHORTAGES OF COPPER, ZINC AND OTHER STRATEGIC METALS AND MATERIALS...

Samples of lead pipe 2,000 years old, prove that the metal lead can take a beating from the elements which other base metals cannot endure.

Pole line hardware is only one of many groups of materials which can be lead-coated instead of galvanized; nails, chaplets, bolts and nuts, iron pipe, conduits, sheet metal boxes, et cetera.

Lead's resistance to the action of sulphuric acid makes it available to replace rubber linings, pipe, et cetera.

Considerable substitution of lead-base for tin-base bearing metals has already been accomplished.

Hard lead (antimonial lead alloy) is replacing brass in plumbing installations and is being used for name plates and instruction plates.

Shortage of tin has resulted in the development of much thinner lead foil, and of collapsible tubes without any tin.

Lead-base die-castings are being substituted for zinc-base die-castings.

Gaskets and washers in many cases can be made of lead instead of rubber.

Lead welding can be used to replace soldering in many instances, thus saving tin.

Industry realizes how important it is to develop substitutes for scarce materials, and is really doing a job in this field.

**ST. JOSEPH LEAD COMPANY**

250 PARK AVENUE • NEW YORK • ELdorado 5-3200

THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES

# THE *Squeeze* IS ON CARBON ELECTRODES

*The above Erie Foundry 1800 Ton Hydraulic Extrusion Press produces long lasting Carbon Electrodes.*

THIS huge extrusion press for making long carbon electrodes up to 30" diameter is one of many that have broken a bottle neck in the war effort.

Erie's complete facilities are devoted to war work.

ERIE

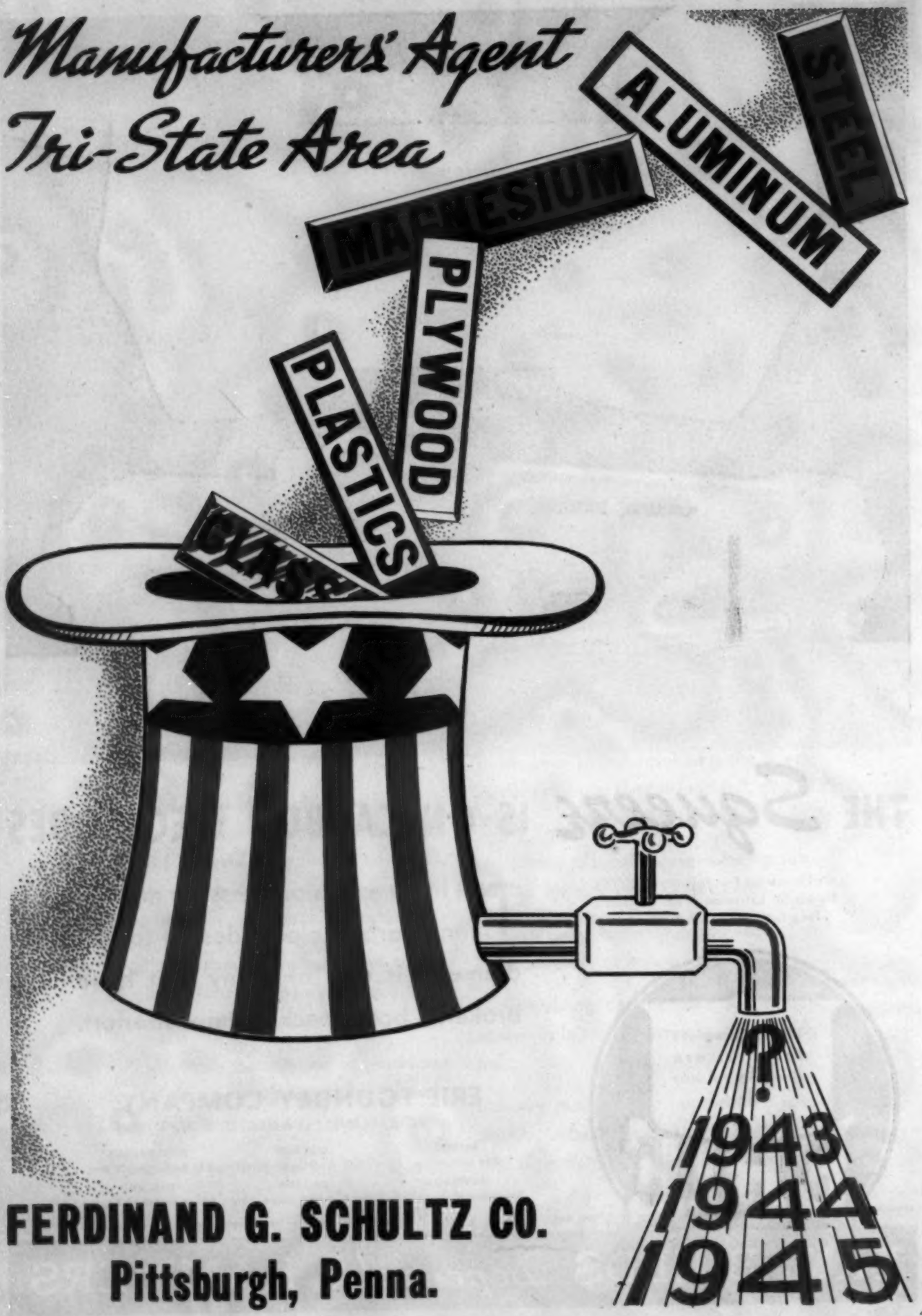
## ERIE FOUNDRY COMPANY

ERIE, PENNSYLVANIA, U. S. A.

| | | |
|---|---|---|
| DETROIT<br>335 Curtis Bldg. | CHICAGO<br>549 Washington Blvd. | INDIANAPOLIS<br>335 Postal Station Bldg. |
| AUSTRALIA<br>Associated Machine Tools | CANADA<br>John Bertram & Sons Co., Ltd | ENGLAND<br>Burton, Griffiths & Co., Ltd. |

ERIE BUILDS *Dependable* HAMMERS

*Manufacturers' Agent*
*Tri-State Area*




**FERDINAND G. SCHULTZ CO.**
**Pittsburgh, Penna.**

# 1 or 100 Horsepower

## ...THEY'VE STOOD THE STRAIN FOR 88 YEARS

Back in the days when Farmer Jones was as proud as a peacock of his steel plow and the clean furrow it turned behind one or a team of horses, Upson Quality Bolts and Nuts were on the job holding plows together.

For 88 years these tough, strong headed and threaded products have been holding things together—securely. Now they're tougher than ever—the result of continued improvement in steels and methods of manufacture year after year.

You'll find them in modern farm machinery—in automotive, railroad, marine and petroleum equipment where service is especially severe—in machines and structures of all kinds—and in the mechanized fighting tools which are playing a most vital part in winning the war.

When we beat our swords back into plowshares again, you can look to Republic for bolts, nuts and rivets even better than those which have made the name UPSON famous wherever headed and threaded products are used.

**REPUBLIC STEEL CORPORATION**
*Bolt and Nut Division*
*Sales Offices • Cleveland, Ohio*
**GENERAL OFFICES • CLEVELAND, OHIO**
Berger Manufacturing Division • Culvert Division
Niles Steel Products Division • Steel and Tubes Division
Union Drawn Steel Division • Truscon Steel Company
Export Department: Chrysler Building, New York, N. Y.

# REPUBLIC

# *Upson Quality* BOLTS AND NUTS

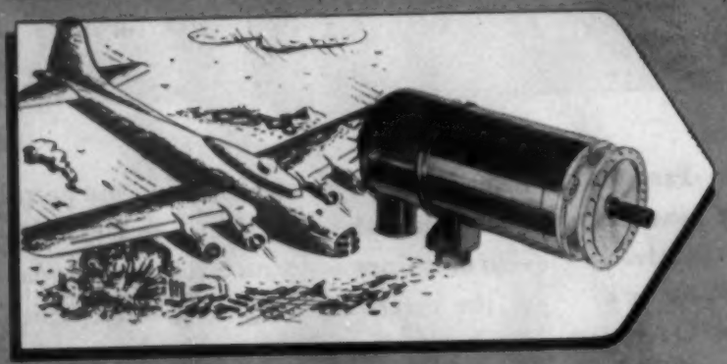
**Other Republic products include Pipe, Sheets, Tubing, Hot Rolled and Cold Drawn Bars—Carbon, Alloy and Enduro Stainless Steel**

# Do You Need

## MOTORS FOR NAVAL APPLICATION

In a space of five weeks, production of a brand new series of motors was raised 400 motors per week. Scheduled delivery to eight different customers was smoothly established.

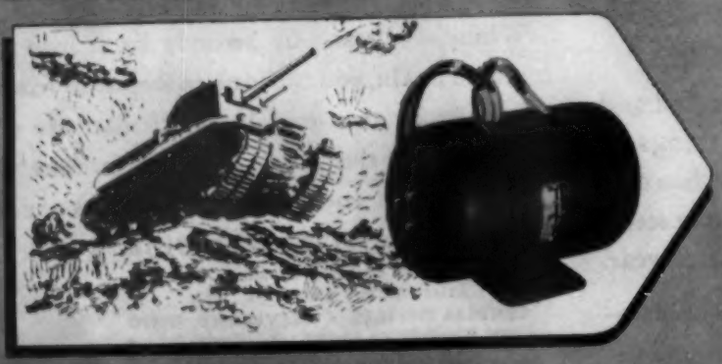
★



## A SMALLER, LIGHTER GENERATOR FOR AIRCRAFT

A generator *one-sixth the weight* of comparable industrial types was developed, meeting stringent specifications for high-altitude performance —a typical example of ingenious G-E design.

★



## A SPECIAL DYNAMOTOR FOR USE ON TANKS

To power radio equipment in tanks, a special dynamotor with increased capacity was developed. Sample in eight weeks; production in large quantities eight weeks after approval.

Builder of TRI-CLAD Motors ★ AMPLIDYNES AIRCRAFT POWER PACKAGES DYNAMOTORS GENERATORS EVERYTHING IN MOTORS

# FIGHTING MOTORS*?

## WE MAY BE ABLE TO HELP YOU

WE invite builders of motor-operated combat equipment to get in touch with us in the earliest stages of planning for their motor requirements. We are building so many new and ingenious fighting motors, it's 10 to 1 that we already have something which can be adapted to meet your needs.

Although we cannot accept any new orders for certain types of fighting motors, we do have, or will have in the very near future, facilities to engineer and build additional fighting motors of other types. We would appreciate the opportunity of reviewing your needs during the earliest stages of your planning, in order to determine how we can help you.

We have the pledge of the more than 1700 design and application engineers in our motor plants to give the fastest service it is humanly possible to give whenever they are asked to help on fighting motors. And even if we must say "No," we believe you will appreciate a fast answer. Get in touch with your local G-E representative to see if the fighting-motor design you need can be adapted to our available production facilities. *General Electric Co., Schenectady, N. Y.*

*"FIGHTING MOTORS" is our term for electric motors in equipment used by our fighting forces —motors which contribute to combat efficiency. In contrast to motors used for production, they may be designed, and produced by the thousands, and declared obsolete—all within a few months.

Fighting motors often require amazing ingenuity in their design, always demand the utmost in reliability, and must be produced with a new concept of speed. They are truly *life or death motors.*

GENERAL ELECTRIC

# Whitcomb

# LOCOMOTIVES

## *They're Doing a "Swell" Job*

**Only an industrial locomotive could reveal the terrific punishment that is dealt out by today's demands of long hours of continuous service, by the efforts to get things done economically and in a hurry. We might follow the figure, and say that a locomotive can't speak—but users of Whitcomb Locomotives say that they speak for themselves. Today Whitcombs are helping to establish new production records that will be written in tomorrow's battle headlines.**

**If you have a tough production schedule that involves transportation problems find out what Whitcomb locomotives can do for you. You'll find they will take a bigger load at a faster pace and reduce the cost per ton. Some of the features your operators will marvel at are the excellent visibility, convenient location of the controls and the snappy smooth response when they gun the throttle. Your transportation worries will be at an end if you put the job in charge of a Whitcomb. Write today for details.**

DIESEL or GASOLINE POWER — MECHANICAL, HYDRAULIC, or ELECTRIC DRIVE

THE BALDWIN GROUP

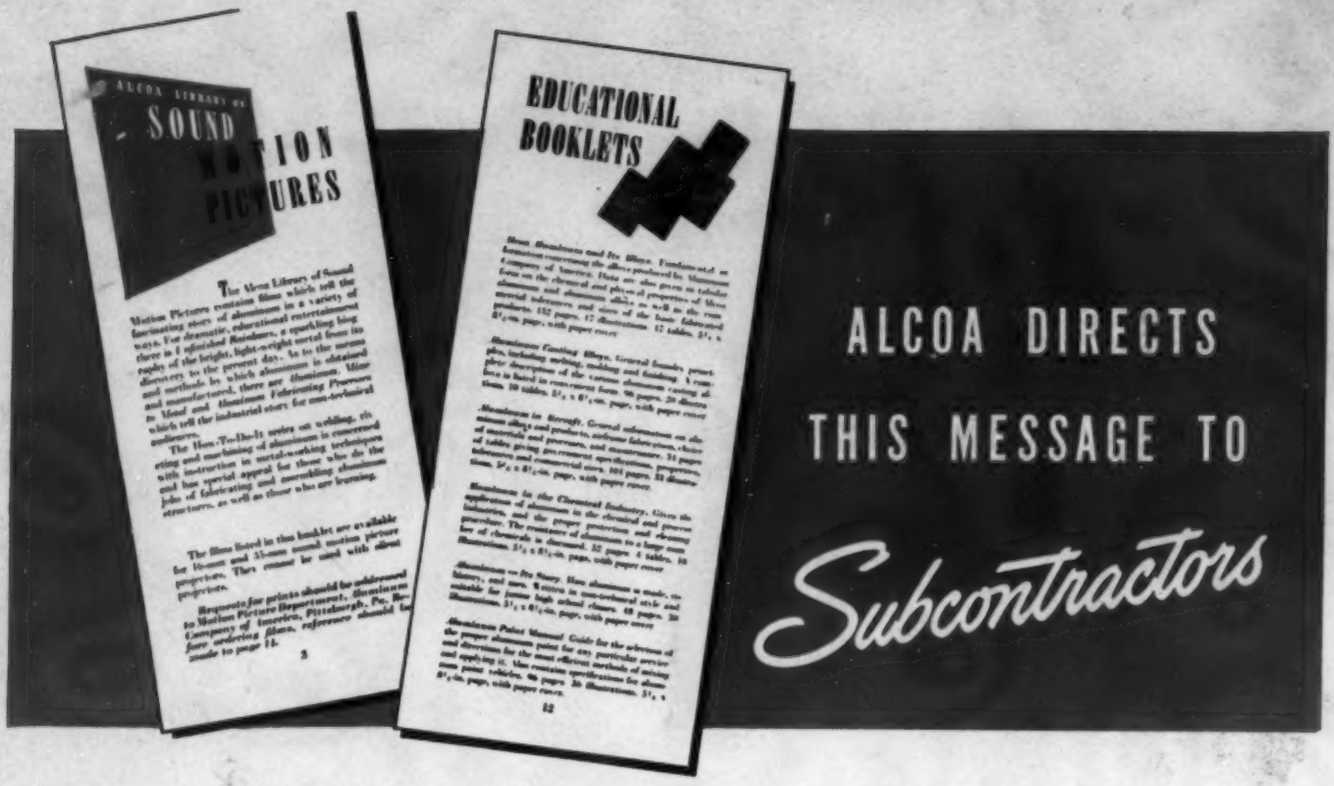
**THE WHITCOMB LOCOMOTIVE CO.**

ROCHELLE ILL.

*Subsidiary of* **THE BALDWIN LOCOMOTIVE WORKS**

# versatile

Heppenstall Automatic Safe-T-Tongs




Are you one of the many companies who are working on airplane subcontracts? It may be the first time you've worked with aluminum, and the job is strange to your workmen. You have received materials and specifications from your prime contractor, but you may need detailed information on some particular phase of the fabricating work.

Aluminum Company of America has prepared both literature and task-instruction motion pictures which are available to you. Often, this material will answer your questions adequately. In some cases, however, you may require help on specific problems.

Alcoa engineers have spent a lifetime developing the best methods for fabricating aluminum alloys. Perhaps we've already helped some airplane builder solve the very problem that has you stymied. We're anxious to pass on all such information as will speed the war effort. Or, if it's a brand-new problem, we're ready to get going on that, too.

A letter or telephone call will start help on its way to you. Contact ALUMINUM COMPANY OF AMERICA, 2112 Gulf Bldg., Pittsburgh, Pennsylvania.

ALCOA ALUMINUM

*Beading operations are easily and quickly performed on a Steelweld. This shows the third and final step in wrapping the edge of a body panel around a pipe to secure the rigidity necessary.*

# STEELWELDS HELP SEAGRAVE BUILD MODERN FIRE APPARATUS

Body panels, hoods, fender aprons, dashes, running boards, gas tanks, and other parts for the pumpers, ladder trucks and fire-fighting equipment made by The Seagrave Corporation, Columbus, Ohio, are fabricated on their two Steelweld Bending Presses.

These parts requiring bending, forming, louvering, beading, punching and notching, are formed a few at the time in production runs as the demand requires. It is easy to switch from one operation to another because it is a quick, simple matter to change the dies.

The satisfactory performance of the first press, a model I-10 installed in 1936, led to the purchase of a second machine in 1941, a model F3-8. The older press handles plate up to ¼-inch by 13 feet and the newer machine up to $\frac{3}{16}$-inch by 11 feet.

By replacing sharp welded or riveted corners wherever possible by quickly made, smooth, round, bended ones, the Steelwelds are proving an important factor in providing the modern, sleek appearance characteristic of Seagrave fire apparatus.

**GET THIS BOOK!**
CATALOG No. 2002 gives complete construction and engineering details. Profusely illustrated

**THE CLEVELAND CRANE & ENGINEERING CO.**
1125 EAST 283RD ST. WICKLIFFE, OHIO.

# CLEVELAND
## STEELWELD PRESSES
GENERAL SALES AGENTS: THE CYRIL BATH CO., E. 70TH & MACHINERY AVE., CLEVELAND

## *Ideas*

**FROM THE DESIGNER'S TABLE!**

IDEAS UNLIMITED! The right shapes for strength and they take less metal. All advantages of this high-production machine are at the designers command.

**. . . FROM THE WORK BENCH!**

"ON THE JOB" WORKERS HAVE IDEAS. Good ones, too! The infinite variety of shapes possibe by rollforming stimulates workers imaginations. Results—many improvements on old products made and suggestions for new products created.

***Other*** **HIGH-PRODUCTION MACHINES BUILT BY THE YODER COMPANY**

POWER HAMMERS for the speedy forming of sections needed in quantities too limited to justify die stamping.

COMPLETE TUBE MILLS for the continuous and automatic welding and cutting off of tubing in sizes from ¼" diameter, .015" wall to 26" diameter, ¾" wall.

ENGINEERING YODER MANUFACTURING

***A COMPLETE LINE OF ROLLFORMING MACHINES AND AUXILIARY EQUIPMENT***

A wide range of sizes is covered by the complete line of Yoder Rollforming Machines. Also, each machine is designed to produce the greatest range with due regard to efficient operation.

**It isn't complete unless Yoder Supplementary Equipment is used in the line!**

Rotary gang slitters, side trimmers, recoilers, uncoilers and cut-offs for the proper handling of strip and formed metal are necessary adjuncts to a rollforming machine.

For the utmost in production speeds and the highest of quality standards . . . USE YODER ROLLFORMING MACHINES AND AUXILIARY EQUIPMENT!

**THE YODER COMPANY**

**CLEVELAND, OHIO, U.S.A.**

# YODER

SPECIAL PRODUCTION METAL FORMING MACHINERY.

# *When Lubrication Fails*

## N-B-M "TIGER" BRONZE TAKES OVER

When running under strain, any machine may develop lubrication trouble. "Tiger" Bronze insures against temporary lubrication failure. Its soft lead, evenly distributed throughout the metal, lubricates the dry shaft and protects the life of your machinery.

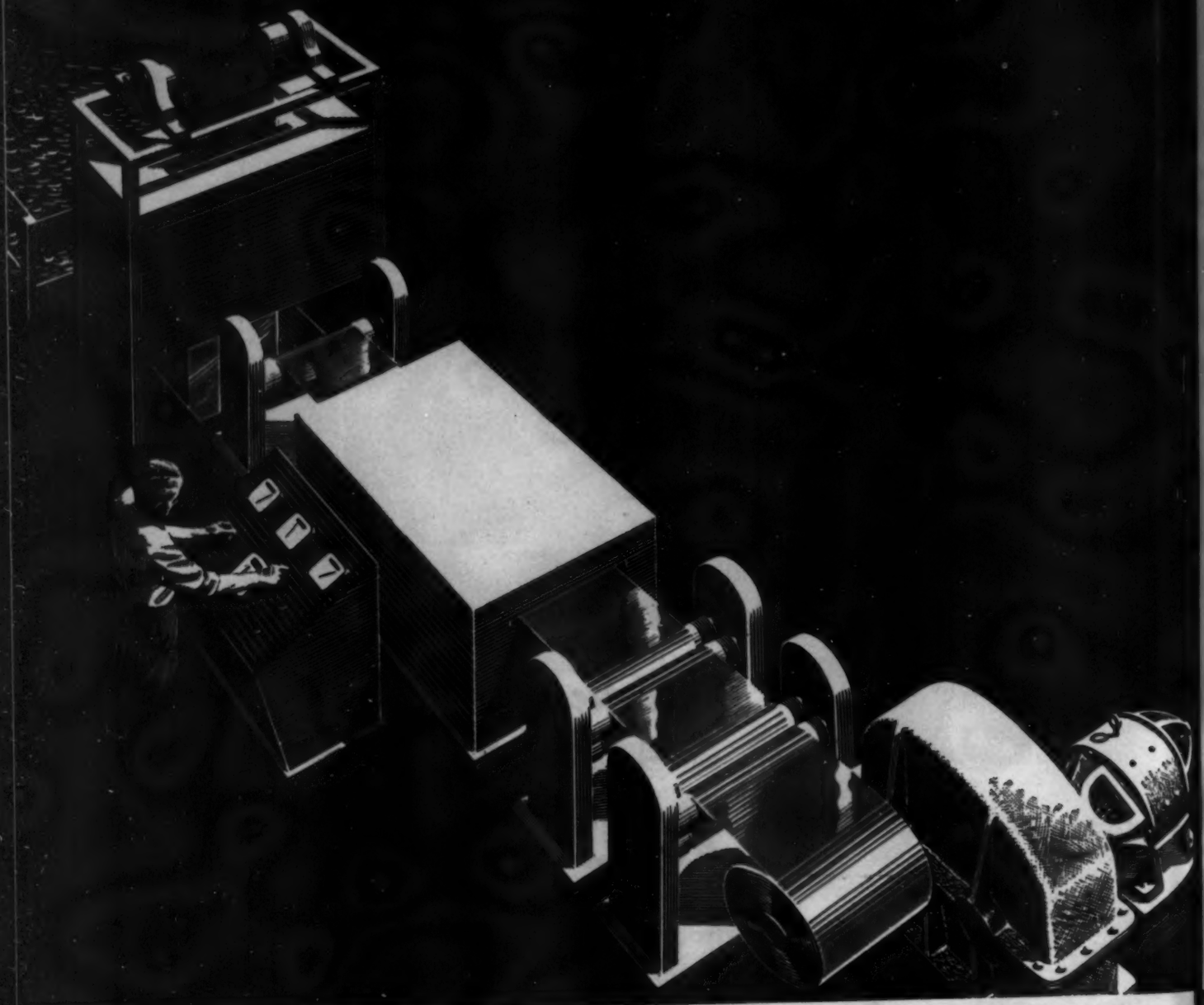
Write for our "Tiger" Bronze Chart—showing the hundreds of sizes of cored and solid bars available—rough and machined.

NBM

**NATIONAL BEARING**
**METALS CORPORATION**
ST. LOUIS • NEW YORK

PLANTS IN: ST. LOUIS, MO. - PITTSBURGH, PA. - MEADVILLE, PA. - JERSEY CITY, N. J. - PORTSMOUTH, VA. - ST. PAUL, MINN. - CHICAGO, ILL.

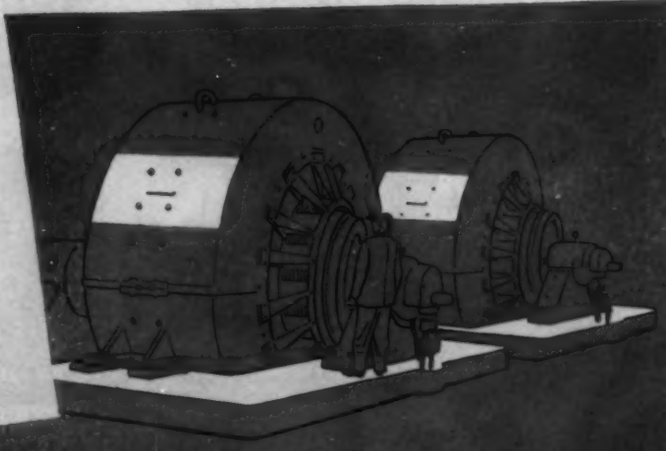
# Tons of Tin Saved . . .



## SAFEGUARD MAIN-DRIVE MOTORS

**Precipitron**—Westinghouse electric air cleaner, provides continuity insurance for main-drive motors and MG sets. By removing all air-borne dirt, dust and soot—including particles as small as 1/250,000 of an inch—this electronic device prevents damaging dirt from settling in windings. Result: increased operating efficiency, with fewer shut-downs for repairs. Write for Booklet B-8605.

*Westinghouse*



# BY INDUCTION HEATING

# "FLOW" PROCESS

For years, most of America's tinplate was made by the "hot dip" process. This took 1½ pounds of tin for every 100 pounds of steel . . . not too much when tin was plentiful.

But when the Japs took Malaya, things changed in a hurry. Tin became a critical material. Vast quantities of tinplate were needed to preserve food for our armed forces. A method had to be found that would not only save tin, but greatly speed production.

Steel engineers developed a way to electroplate steel strip with a coating of tin only *thirty-millionths* of an inch thick—a method which would save two-thirds of our war-scarce tin. But the problem was to "reflow" the granular, dull-gray coating deposited by electrolysis so it would be perfectly smooth and corrosion-resistant—and do it at speeds that would permit greatly increased production.

Westinghouse engineers were called in. Working closely with steel engineers, they developed a method of high-frequency induction heating with electronic control. Within 7/10 of a second after strip enters the heating coil, its fusion temperature of 450 degrees F. is attained. There is no contact between tinplate and heating coil—no danger of arcing or burning. The "flowing" operation is made an integral part of the tinning line, instead of a separate operation requiring additional handling.

600 kw units are now in operation, turning out tinplate at 500 f.p.m.—as compared with 150 to 200 f.p.m. by old methods. 1200 kw units are being built that will step up delivery speeds to 1000 f.p.m.

Soon a large part of U. S. tinplate will be rolling from production lines using this method. Tons of vital tin will be saved—as a result of close co-operation between Westinghouse and steel industry engineers.

This kind of Westinghouse engineering co-operation is available to *you* at any time, in solving any problem involving electrical power. Just phone your nearest Westinghouse office. Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pennsylvania. J-94544

**Westinghouse**

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

## WESTINGHOUSE ENGINEERING SERVICE

A nationwide corps of engineers offers you electrical and production experience gained through years of working with the steel industry.

In addition to engineering help on specific industry problems involving electrical power, these men can give you assistance on these other vitally important activities:

PRODUCT DEVELOPMENT: engineering of equipment to meet war requirements.

MAINTENANCE: help in making existing equipment serve better, last longer.

REHABILITATION: redesigning and rebuilding obsolete equipment for useful service.

MATERIAL SUBSTITUTION: adapting available replacements for critical materials.

W.E.S. is available to all branches of the steel industry. Put it to use today on your production problems.

A
RUGGED
B'AR
GUIDE
THAT
WON'T
LET
YOU
DOWN

**TRANTINYL**
**BAR MILL GUIDE**

*Youngstown Alloy Casting Corporation*

YOUNGSTOWN, OHIO

# Probably Your Mallory Distributor Can Give You Help Like This—

Somewhere in the Middle West is an aircraft engine manufacturer who uses many Mallory Electronic parts in dynamometer test cells. Recently he sent us a hurry call for some Mallory phone jacks to go in the control panel of a new cell being rushed to completion. He had the right priority, too.

It was a standard jack, but as is so often the case with manufacturers immersed in war production, it was out of stock. To produce it, we would have had to start from scratch—"when, as and if!"

But we referred his request to the local Mallory distributor —who filled his needs from stock.

This is just a sample of how Mallory distributors can help. We do our level best to furnish them with adequate stocks so that essential electronic parts to fill small orders with high priorities may be handled promptly.

It will pay you to maintain a contact with your local Mallory distributor. He will give good service, furnish your purchasing department with complete information and prices; your engineering and design departments with application data; work his head off to get you those parts you need for maintenance, test equipment and pre-production models.

**P. R. MALLORY & CO., Inc., INDIANAPOLIS, INDIANA**

*Cable Address*—PELMALLO

Get acquainted with your local Mallory distributor. Or if you do not know who he is, write us and we will put him in touch with you. And, for good measure, we will send along a copy of the Mallory Catalog for ready reference.

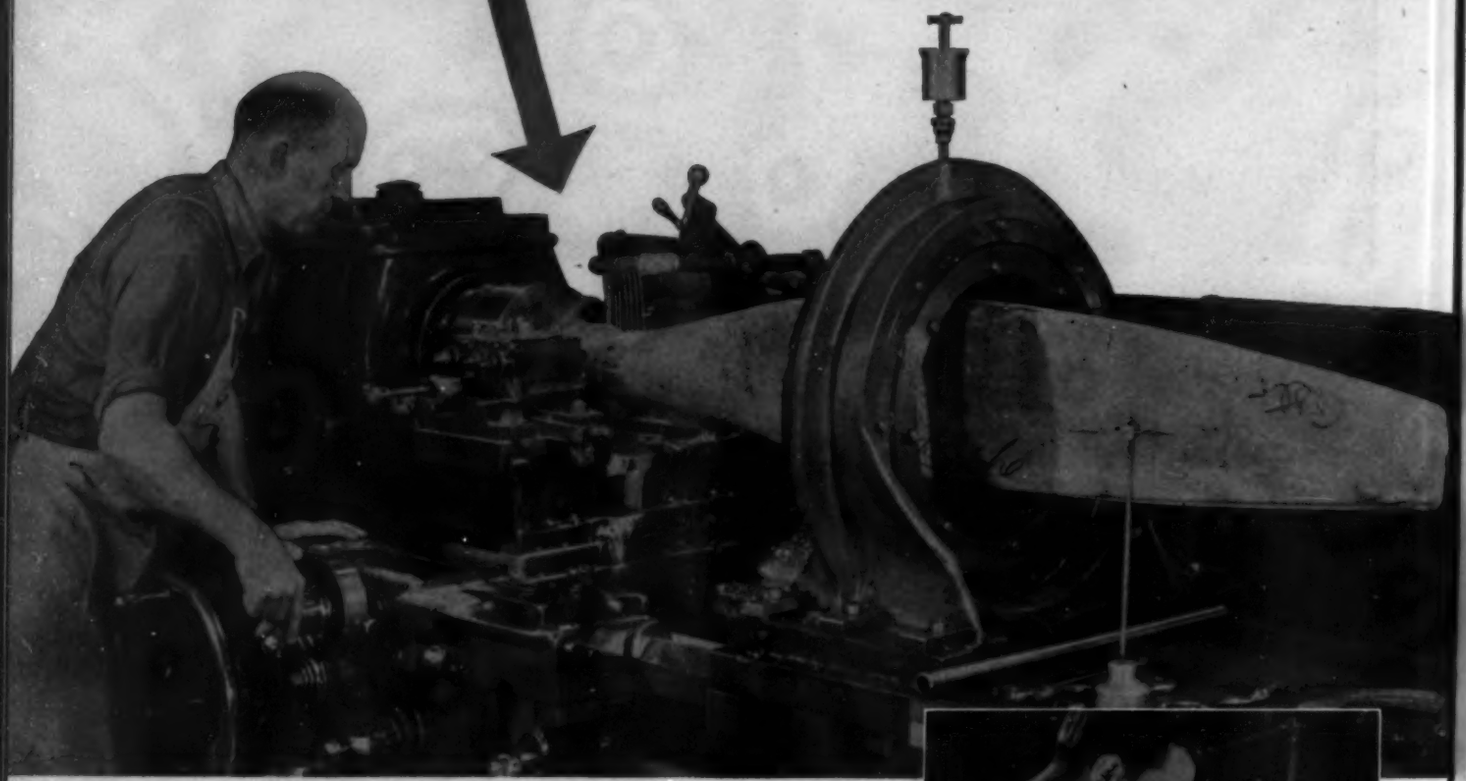
P. R. MALLORY & CO. Inc.

MALLORY

APPROVED

PRECISION PRODUCTS

# 13 *tools..but only* 1 *setup*



*Photographs by courtesy of Curtiss-Wright Corp., Propeller Division*

Multiple tool setups are often complicated and expensive, and sometimes prohibitive, but in this case the value of careful job analysis has in practice proved to be productive, accurate and economical.

Requirements in slides, tool function and blade support (details omitted) all combine to the successful machining of propeller hubs, which includes straight turning, taper turning, grooving, etc.

Whether the work be small and delicate or large and rough, our engineers will be glad to work with you in determining efficient methods of machining.

Time is saved. This 12″ Monarch is equipped with double-power angular feed, for machining both angles of a bevel gear, simultaneously.

**MONARCH LATHES**

COVER THE TURNING FIELD

THE MONARCH MACHINE TOOL COMPANY · SIDNEY, OHIO

*"Welderettes" prove expert workmen on difficult job of fabricating tank hulls. Page 106*


# STEEL

*The Magazine of Metalworking and Metalproducing*

**APRIL 26, 1943**

*Volume 112* *Number 17*


## NEWS


Truman Findings To Affect Plate Output Only Slightly ... 49
Steel Earnings Below Peacetime Year; Output, Taxes at Peak ... 51
New 3-Strand Mill in California Delivers Rods at Mile-a-Minute ... 52
WPB Urging Wider Use of NE Steels as Aid to War Program ... 54
Maritime Commission Awards Contracts for 469 Cargo Vessels ... 55
Co-operative Program Formed To Aid Small Manufacturing Plants ... 56
Treasury Wants 4,000,000 More Workers To Buy War Bonds ... 60
Congress Still Hostile to OPA; Demand Higher Oil Price Ceiling ... 61
Priorities—Allocations—Prices ... 62
Revised WPB Questionnaire To Simplify Reports of Manufacturers 63
Economist Urges Immediate Action to Avert Postwar Unemployment 72
Men of Industry ... 74
Obituaries ... 76
Railroads' Capital Expenditures in 1942 Second Highest Since 1930 77
Metalworking Companies Honored by Armed Services ... 78
War Plant Expansions, Equipment Authorized by DPC ... 79
Financial News ... 80


## FEATURES


Behind the Scenes with Steel ... 4
As the Editor Views the News ... 45
Windows of Washington ... 60
Mirrors of Motordom ... 65
Wing Tips ... 68
The Business Trend ... 81
Industrial Equipment ... 120
Helpful Literature ... 133
New Business ... 156
Construction and Enterprise ... 158


## TECHNICAL


Report on Experience with NE Steels in Aircraft Engines ... 84
Reclaiming Precision Gages by Chromium Plating ... 86
Sleevebrick and Nozzle Problems ... 94
Women and Warplanes Will Help Win this War ... 101
Brazing Wire Rope Ends for Safe Handling ... 104
Welding Tank Hulls with a Crew of "Welderettes" ... 106
New Broach Finishes Round Holes ... 110
Materials Handling Facilities Aid in Plant Conversion ... 112
Standard Lathe Form-Turns Parts Automatically ... 119


## PRODUCTION


Steelworks Operations for Week ... 53


## MARKETS


Steel Consumers Are Covering Further Ahead ... 139
Market Prices and Composites ... 140

*Index to Advertisers* ... 165
*Where-to-Buy Products Index carried quarterly*



**EDITORIAL STAFF**

E. L. Shaner
*Editor-in-Chief*

E. C. Kreutzberg
*Editor*

A. J. Hain
*Managing Editor*

G. W. Birdsall
*Engineering Editor*

J. D. Knox
*Steel Plant Editor*

Guy Hubbard
*Machine Tool Editor*

Arthur F. Macconochie
*Contributing Editor*

D. S. Cadot
*Art Editor*

**Associate Editors**

G. H. Manlove, W. G. Gude, W. J. Campbell
*New York*
B. K. Price, John H. Caldwell, L. E. Browne
*Pittsburgh*, R. L. Hartford; *Chicago*, E. F. Ross
*Detroit*, A. H. Allen; *Washington*, L. M. Lamm
*London*, Vincent Delport

**Assistant Editors**

J. C. Sullivan, Jay DeEulis, La Verne Nock
D. B. Wilkin, J. M. Kurtz

**BUSINESS STAFF**

G. O. Hays
*Business Manager*

R. C. Jaenke
*Advertising Manager*

C. H. Bailey
*Advertising Service*

*New York*, F. W. Kreutzberg, K. A. Zollner
*Pittsburgh*, S. H. Jasper, B. C. Snell
*Chicago*, J. C. Pelott
*Cleveland*, R. C. Jaenke, D. C. Kiefer
*Los Angeles*, F. J. Fuller
J. W. Zuber
*Circulation Manager*

**Main Office**

Penton Building, Cleveland, Ohio

**Branch Offices**

*New York*.....110 East 42nd Street
*Chicago*.....520 North Michigan Avenue
*Pittsburgh*.....Koppers Building
*Detroit*.....6560 Cass Avenue
*Washington*.....1123 National Press Building
*Cincinnati*.....2030 Carew Tower
*Los Angeles*, 130 North New Hampshire Avenue
*London*....2 Caxton Street, Westminster, S.W.1

* * *



Published by The Penton Publishing Co., Penton Building, Cleveland, Ohio. E. L. Shaner, President and Treasurer; G. O. Hays, Vice President; F. G. Steinebach, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers, Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $6; two years $10; all other countries, one year $12. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.


Copyright 1943 by the Penton Publishing Co.

# . . . we found Graybar had 'em on file"

## *(another example of the time-saving gains of Graybar MM Service*)*

**A firm that was "up to its neck"** in war production was confronted with a new questionnaire from Washington concerning the amounts of strategic materials it required. Many of the essential electrical supplies used by this firm were partly or wholly made of these materials.

**The compilation job looked overwhelming** to the firm's overworked office staff. Then, someone pointed out that virtually all the electrical items were being purchased "via GRAYBAR." Perhaps GRAYBAR'S records could help.

**Sure enough,** GRAYBAR'S records of shipment and files of product information were so set up that it was possible to assemble the required data right in GRAYBAR'S local office. So far as electrical supplies were concerned, the job was done quickly and accurately, in strict accordance with governmental regulations.

**This is only one example** of GRAYBAR'S ability and willingness to work with you to smooth out matters of record-keeping and red tape when you buy electrical supplies. If your procurement procedure is necessarily complicated, we'll fill out every form "to the letter." But if a chance exists to help *cut down* on paper-work we'll try just as hard to help you find it.

### *Serving as your MATERIALS MOBILIZER

By this GRAYBAR service, your electrical needs are linked to the available output of 200 manufacturers, mobilized locally at more than 80 warehouses. The MM Plan "dovetails" GRAYBAR'S procurement work with your own purchasing requirements. You save time in getting estimates, checking specifications, expediting delivery, locating "hard-to-get" items. Ask your local GRAYBAR Representative how this "one-call" service can help you.

Executive Offices:
GRAYBAR BUILDING
New York, N. Y.

# GraybaR

IN OVER 80 PRINCIPAL CITIES

"GRAYBAR" Everything Electrical . . . . THAT IT TAKES TO WIN!

# AS THE EDITOR VIEWS THE NEWS

STEEL
April 26, 1943

**THIEVES AT WORK:** Production for war is emphasizing the importance of precision gages in American manufacturing. Industry not only needs an unprecedented volume of gages but it is also forced to do everything possible to prolong the lives of gages already in service.

This challenge has prompted extensive experimental work in chromium plating. Hard chrome plating has been used for years as a method of building up worn gages to size. However, the tendency of the deposited metal to build up more on the edges and high points than on the middle of flat surfaces and on low points of gages has been a problem. The experimenters have been looking for refinements in the electroplating process which would insure a more even deposit.

They have found a satisfactory solution. It involves four factors (p. 86), namely proper arrangement and design of the anodes, proper use of shields, method of racking the work and the skillful use of "thieves." Apparently the last named factor—the work of the thieves, which rob metal from the edges and high points of the gages, is extremely important. It, in conjunction with the accurate control of current density, is the key to success in uniform plating.

Putting the thieves to work is a commendable forward step in conservation.

* * *

**EMERGENCY STEELS:** Although hundreds of steel consumers have adapted the NE steels to their requirements, many others are continuing to specify the orthodox alloy grades they were using before the war. The Steel Division of WPB believes that a substantial proportion of consumers who have not yet changed to the NE steels (p. 54) could do so not only to their own advantage but to the benefit of the entire war program.

Where there is a reluctance to swing to the emergency steels, the reason usually can be traced either to a conviction that the work is so important that one hesitates to change from a steel that has produced uniformly good results over a long period, or the user is not fully informed as to the experience of those who have used NE steels successfully.

To insure the greatest possible use of NE steels requires an intelligent educational campaign. Although much has been done to publicize the emergency steels and there is little excuse for any important consumer to plead ignorance on the subject, it is true that more can be done to help users solve their problems of adaptation. Also it would be advisable for the authorities to place more emphasis upon the extent to which a wider use of NE steels would help to solve some of the broad problems of steel supply from a national standpoint.

* * *

**GOOD NEIGHBORS:** No one should make the mistake of dismissing the historic meeting of Presidents Roosevelt and Comacho in Mexico as merely a polite gesture of international amity. The event has much deeper significance.

For instance, when the Presidents exchanged pledges of more effective co-operation between their respective republics, they were speaking from a banquet table in Monterrey not far removed from the site of Mexico's largest iron and steel establishment. The blast furnaces, steelworks, mills and foundries of the Monterrey Iron & Steel Co. in Neuvo Leon and the building or projected facilities at Monclova and Piedras Negras in the adjacent state of Coahuila are in themselves a demonstration of the better teamwork of the neighboring republics which has existed in recent years.

President Roosevelt's quick dash into Mexico also created a situation unprecedented in American history. With Vice President Wallace in South America, the President's crossing of the Rio Grande meant that for the first time the nation's two leading executives were outside the borders of the country at the same time. The fact that both were in Latin America sharply accented the importance of inter-American relations.

In view of the renewed emphasis given this subject by the President's visit, the editors of STEEL are highly pleased over the increased attention they have been devoting to Latin American affairs in recent issues. The response to articles in the Jan. 11, Jan. 18 and April 19 (p. 68) issues indicates that American manufacturers are intensely interested in postwar trade opportunities in the countries south of the Rio Grande.

No less gratified are the publishers of STEEL,

(OVER)

whose first Portuguese and Spanish editions of REVISTA INDUSTRIAL—a new publication designed to acquaint South American customers with industrial equipment made in the United States—were rolling off the presses at the precise time when the President was acclaiming the benefits of the good neighbor policy.

° ° °

**DISTRESSED PLANTS:** Probably no problem arising from the present war has proved more difficult than that of integrating small manufacturing establishments into the war program. Half a dozen or more agencies have tackled the job and some progress has been made, but the results are far from satisfactory.

Now a new approach (p. 56) is contemplated. The Smaller War Plants Corp. will co-operate with national and regional manufacturers' associations in a fresh attempt to bring prime contractors and potential subcontractors together. The plan involves a register of smaller war plants and a directory of work the prime contractors wish to subcontract.

Interesting are two definitions employed by SWPC: A distressed plant is one operating at less than two-thirds of normal capacity. "Small business" is a unit doing, in normal times, a relatively small percentage of the total national volume of the specific industry.

° ° °

**SOUND INSPECTION:** It is unfortunate that the current discussion over steel specifications has been linked with the recent exposure of alleged "faking" on tensile tests. Everybody who knows anything about the manner in which specifications are developed and the procedure by which they are employed in practice realizes that an honest discussion of the "workability" of specifications is pertinent in wartime, regardless of whether or not the issue of "faking" has been raised.

Specifications are drafted by committees. They take into consideration the requirements of the user. These primary considerations usually are tempered somewhat by the ability of the manufacturers to maintain the quality desired. At best, the finally adopted specification is a compromise which affords the customer the material conforming as closely to his requirements as the average or slightly above-average performance of the producing industry will permit.

Such specifications give relatively little trouble in peacetime, but under the pressure of war they are likely to precipitate questions of policy. A government inspector who is not too sure of himself is likely to lean heavily upon the strictest interpretation of specifications to protect himself against mistakes. In thus bending over backward, he may easily condemn on technicalities material which would serve its intended purpose satisfactorily from every standpoint.

At the same time another government inspector—thoroughly experienced and confident of his judgment—will almost ignore the technicalities and will accept or reject the material on the basis of his opinion as to whether or not it will serve the purpose intended. His system aids production and it safeguards the customer.

Most of the present discussion centers around the desirability of using more ordinary intelligence and less reliance upon technicalities in the acceptance or rejection of materials for war purposes. Donald Nelson's admonition to inspectors to use "common sense" (p.49) and WPB's move to "harmonize" specifications with true requirements are sound.

° ° °

**PETTY POLITICS:** If an impartial observer were to make the rounds of Washington for a week or two, he would be surprised and horrified at the extent to which petty politics enters into deliberations on important wartime problems.

For instance, consider the present tax situation. Two weeks ago the muddle was so bad that most persons said it couldn't be worse; it would have to get better. Today it is no better and probably is worse; although there is consolation in the fact that the deadlock caused by die-hard stubbornness in the House Ways and Means Committee will force the issue to open debate on the floor, where action may eventually ensue.

Almost equally disgraceful is the partisan feeling about the Reciprocal Trade Agreements Act. There is room for an honest difference of opinion on some aspects of this legislation, but there is little reason for making it a political football.

A little intelligent pressure from home might awake Congress to the fact the nation is at war and that taxes and trade agreements are problems worthy of impartial consideration.

E. L. Shaner

EDITOR-IN-CHIEF

# Don't Throw It Away!

## *It Isn't a Total Loss*

Great war-time value still remains in cutting tools even though they are broken, or worn beyond further use. They contain precious alloys, some of which cannot be replaced at any price—alloys that are essential for the manufacture of replacement cutting tools—alloys that are vital for the production of war equipment, upon which depend the lives of our fighting men, and ultimate victory.

Machine operators can make a real contribution to the war effort if they will care for their tools—keep them properly sharpened—protect them from damage or loss—use them under conditions that will give the longest possible life. Many tools are lost or broken through carelessness. Some can be repaired.

But if tools can no longer be used, *don't throw them away!* Gather and segregate them so they can be sent to steelmakers, who will charge them into furnaces, saving all the critical alloys for new tools and war equipment.

An important part of the fight on the home front is to save critical alloys. Work out a plan today to collect and segregate all alloy-steel scrap in your plant.

ARMY E NAVY

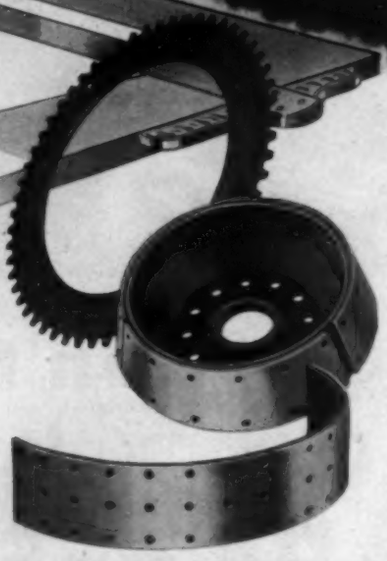
# INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City

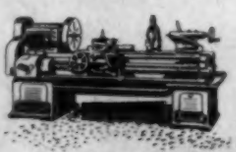
# *He's Writing the Peace TODAY...*

## *with* VELVETOUCH

Tomorrow's clutches and brakes will be even more rugged and efficient—thanks to the wider use of VELVETOUCH. Today, while most of the output of this remarkable friction material is going into the war effort, engineers in a hundred drafting rooms are designing post-war machinery that will do more work at lower cost. In all brake and clutch applications they will utilize the many superior qualities of VELVETOUCH which give the user an assurance of smooth, positive, trouble-free operation . . . uniform coefficient of friction . . . capacity for sustained operation at high temperature.



VELVETOUCH is an all-metal friction material — a combination of sintered powdered metals, compressed and welded to a solid metal backing. Can be supplied in a wide variety of constructions for all clutch and brake applications.



TRADE MARK REG U S PAT OFF

Velvetouch

**THE S. K. WELLMAN CO.**

1374 EAST 51ST STREET
CLEVELAND, OHIO, U.S.A.

PIONEERS IN PUTTING POWDER METALLURGY TO WORK FOR INDUSTRY

# Truman Findings Expected To Affect Output Only Slightly

***Nelson cautions producers not to "lean over backward" in meeting specifications. . . Continued peak output termed essential. . . Some reduction in April tonnage likely***

PLATEMAKERS anticipate no sharp reduction in output as a result of the insistence by the Truman committee on complete fulfillment of government specifications.

There has been no need, producers say, to change inspection policies, nor does it appear that inspectors for the government have become more exacting.

Generally, producers are following the instructions telegraphed by WPB Chairman Donald M. Nelson to use "honest good judgment" and to "avoid the danger of delaying the entire (ship-building) program by blind, unthinking insistence on unattainable perfection."

Disclosure by the Truman committee that tests had been "faked" by Carnegie-Illinois Steel Corp. and the wide-spread publicity that followed occasioned cases of "inspection jitters" and led to reports that April plate output would be drastically reduced as a result. In some quarters it was predicted that the reduction of some mills would be as great as 50 per cent.

Cognizance of this danger was taken by steel men and government officials and a conference was called in Washington by WPB Steel Director H. G. Batcheller to clarify testing procedures, designed to maintain maximum production of plate.

Representatives of the armed services and Maritime Commission emphasized that everything possible would be done to eliminate testing requirements or stipulations which might unnecessarily delay deliveries to U. S. shipyards.

WPB has assigned William F. Gibbs, its controller of shipbuilding, to direct a study of specifications for steel plate with a view to revisions "harmonizing them with the true requirements."

Some platemakers said they would not be surprised if plate tonnage in April should decline from the all-time high of March. They pointed out that the month is one day shorter, and that a record month often is followed by a letdown.

Moreover, they add, that while ship requirements are as heavy as ever and that these needs dominate the plate picture, there has been an easing in plate needs for certain types of ordnance.

Producers would not hazard a guess as to how great the reduction may be, although several leading makers said their mills were continuing at capacity.

Generally, producers viewed the Carnegie-Illinois incident as "unfortunate" but one which aroused more criticism than was merited. A report released by the Truman committee last week quoted B. F. Fairless, president, United States Steel Corp., as denying that the safety of ships was jeopardized by substandard steel supplied by his company.

Mr. Fairless was backed up in this contention by Rear Admiral Howard L. Vickery, vice chairman of the Maritime Commission, who said the plate in question would have been accepted by the commission had it been advised of the minor deviations in specifications.

Mr. Fairless told the committee: "Irregular as the practice may have been in testing plates at the Irvin works, the charges that the safety of ships and the lives of men have been jeopardized by the inclusion of a small proportion of product which fell below the specified minimum tensile strength by approximately 5 to 6 per cent cannot be justified on the basis of engineering analysis, metallurgical knowledge or experience in shipbuilding.

"Something more fundamental than the irregularities at Irvin was responsible for the cracking of certain welded ships," Mr. Fairless contended.

"Carnegie-Illinois has never stated that it will be unable to maintain its plate production if it is required to conform to existing specifications. It has taken the position, however, that if plates of lower tensile strength than now specified are fully suitable for shipbuilding purposes, then in the

*Plate production has been increased 400 per cent since outbreak of war. Output in the past 12 months totaled 12,793,060 net tons, compared with 2,558,358 in 1939. Much of the increase has been due to conversion of mills built to roll sheet and strip. At right is an action shot of the 110-inch semi-continuous plate mill, Homestead, Pa., Works of Carnegie-Illinois Steel Corp.*

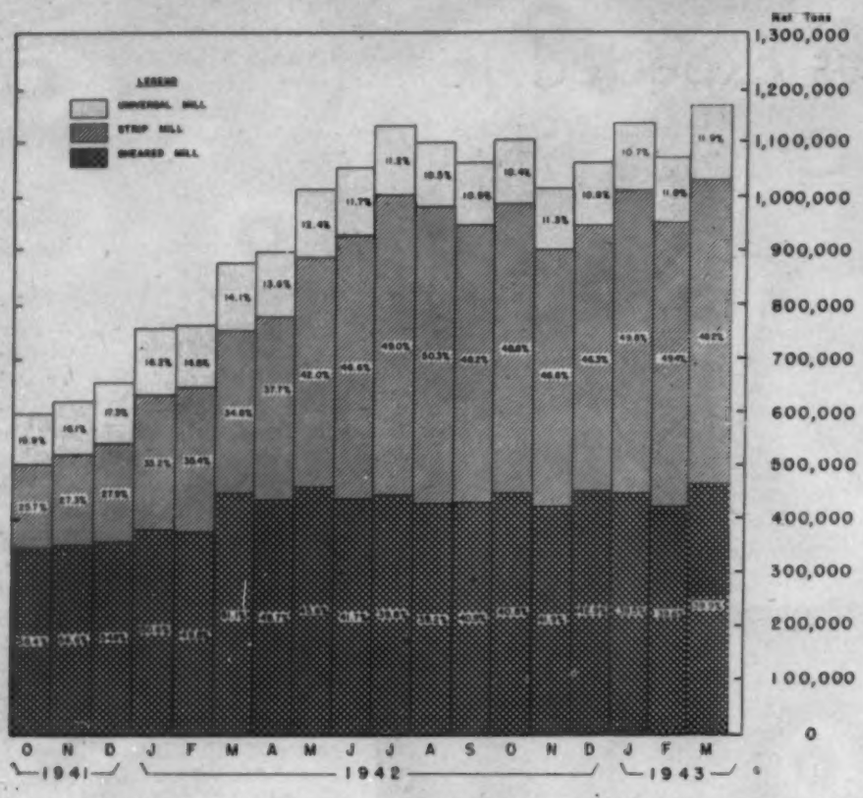



*Plate shipments in March rose to an all-time high of* 1,167,679 *tons. Nearly half of this tonnage was rolled on strip mills*

interest of maximum production of a much needed war material existing specifications should be modified to secure that maximum production, especially from converted strip mills such as the Irvin works."

WPB Chairman Nelson in a wire to all plate producers said:

"It is vitally important to the war program that inspections and tests on steel plate be applied in such a way as to meet two essential objectives—that the plates meet the specifications and tolerances set by the procurement agencies, and that the volume of plate produced and shipped be maintained at the highest possible level.

**Must Maintain Volume**

"I am of course aware that since the recent disclosures at the Truman committee hearings, both industrial and government inspectors in every plate mill in the land have been more than usually vigilant. It is proper that they should be so, of course, and I have complete confidence that there will be no repetition anywhere in the industry of the kind of thing disclosed before the Truman committee. But it is equally important that the volume of steel plate produced and shipped be maintained, and over-rigid inspection practices could easily defeat that end.

"The Navy, the Maritime Commission, the War Department and the War Production Board fully realize that 100 per cent uniformity in steel is rarely attainable. Minor variations will frequently be found in steel plates which can be used for ship construction with complete safety, since the naval architects' specifications are invariably drawn so as to leave an ample margin above the maximum stresses which are to be expected in actual service. It would be disastrous if serviceable plate should be rejected in such volume as to diminish the quantity which can be delivered to the yards.

"With the enormous and increasing pressure of our shipbuilding program, it is absolutely necessary that sober good judgment guide the entire testing and inspection process. If, to avoid all appearance of laxity, we stand up so straight that we lean over backward, we shall simply delay the whole ship building effort—with possibly ruinous consequences. It would be quite as bad to be so rigid as to be too lax.

"What we all want is plate from which serviceable ships can be made—plate which the builder of cargo carrier or a cruiser can put into the vessel with full confidence in its dependability. That in general is what we have been getting during the past year; the inspection practices which gave us that kind of plate should be continued. It is perfectly possible to cut plate production so sharply as to cripple the whole program simply by insisting on the rejection of plates because of minor variations which do not affect the serviceability of the plate in the slightest; it is also possible, however, to maintain the proper safety standards while recognizing the customary, accepted margins for error.

"Honest good judgment in testing and inspection is the basic need. By all means, let us make sure that the plate sent to the yards will give us ships which deserve the confidence of seamen and the nation itself; but by all means, also, let us avoid the danger of delaying the entire program by a blind, unthinking insistence on unattainable perfection."

## WPB Allows Victory Gardeners $10 of Mesh Wire Fencing

Victory gardeners and backyard chicken raisers have the privilege of buying up to $10 worth of mesh wire for fencing, War Production Board announced last week. No priority rating or purchase certificate is needed.

For the purchase of more than $10 worth of mesh wire, application for a priority rating must be made on Form PD-1A. Such applications will receive consideration only when made by established farmers, and in such cases WPB will have to be convinced that more than $10 worth of wire is needed before priority is granted.

Announcement was made to clarify withdrawal of Department of Agriculture from control of mesh wire made available for farmers. The county war board no longer will issue purchase certificates for mesh wire. Farmers seeking more than the $10 limit will be required to file applications PD-1A with the nearest WPB district office.

## February Building Volume Declines 5 Per Cent

Total volume of construction activity in the United States amounted to $756,000,000 in February. This represented a decline of 5 per cent from January.

February total is 8 per cent below the monthly volume of a year ago, and 48 per cent under August, 1942, when construction activity reached a peak of $1,468,000,000. Another decrease of 7 per cent is estimated for March.

Restrictions on war-time civilian construction have been eased slightly in certain "minor construction" categories by an amendment of Conservation Order L-41, which controls civilian building operations.

# Earnings Below Peacetime Year; Output, Taxes, Payrolls at Peak

NET earnings of the steel industry in 1942, the greatest year for steel production on record, were substantially less than in many peacetime years, representing a return of only 5.6 per cent on investment, according to the American Iron and Steel Institute. STEEL's compilation of 22 leading companies, April 12, showed a net of 5.68 per cent.

After meeting payrolls, taxes and all other charges, 75 companies accounting for more than 90 per cent of the industry's production, showed an aggregate net income last year of $221,230,000.

In five of the ten years of the 1920's, the industry earned more than in 1942, despite the fact that at no time in that period did steel production come within 75 per cent of the 1942 tonnage.

Because of a 32 per cent increase in the industry's tax bill between 1941 and 1942, with a 30 per cent rise in payrolls, total earnings of steel companies last year dropped one-third below the $326,090,000 earned in 1941. In that year, the companies earned 8.1 per cent on their investment.

Total sales by the industry in 1942 are estimated at $6,275,000,000—a new peak, 19 per cent above the previous 1941 record. Included in that figure are the sales of some steel company subsidiaries that do not produce steel but are engaged in such activities as shipbuilding, steel fabricating, etc. Profits per dollar of sales in 1942 amounted to 3.5 cents, against profits of 6.2 cents per dollar of sales in 1941.

The total of $776,104,000 paid out in taxes in 1942 compared with $588,216,000 in 1941, and represents a new peak for both federal taxes and state and local taxes.

Comparison of the taxes paid by an identical group of major steel companies shows that the tax bill per ton of finished steel produced in 1942 was $12.60 per ton—about one-third higher than in January, 1941 and also almost five times as large as in 1929. Taxes absorbed 12.6 per cent of sales income in 1942, three times as much as in 1929 and 11.5 per cent more than in 1941.

Total payrolls of $2,176,051,000 in 1942, likewise set a new record, exceeding the previous peak of $1,673,234,000 in 1941. Both payroll figures include payrolls of certain subsidiary companies which do not produce iron or steel products.

Dividends to stockholders in 1942, however, were less than in 1941 and also were below the total paid out in such periods as 1928-1930, inclusive, and 1937. Dividend payments in 1942 to the industry's 549,000 stockholders totaled $152,716,000 as against $166,215,000 in 1941. Stockholders dividends in 1942 amounted to 7 cents per dollar of payrolls distributed, compared to 10 cents per dollar of steel payrolls in 1941.

---

Salaries and wages paid government employes in 1942 totaled $13.5 billion, including federal, state, and local units and the armed services, slightly exceeding combined salaries and wages paid in all manufacturing in 1939, Division of Industrial Economics, National Industrial Conference Board, New York, reported last week.

## BOYS, GIRLS REPLACE MEN CALLED TO ARMED SERVICES

SELECTED group of 16-year-old boys has been admitted to the apprentice training course at the Westinghouse Electric & Mfg. Co. lamp division at Bloomfield, N. J., to provide replacements for men drawn into the armed services. Left above, a veteran worker instructs one of the youthful inductees. Another method of meeting the problem is illustrated, right, where girl is instructed in time-study at Reliance Electric & Mfg. Co., Cleveland

*Finished bundles of rods are shown on the apron conveyor in the new continuous rod mill at Pittsburg, Calif. From this conveyor, the bundles transfer automatically to a hook-carrier conveyor, designed to cool rods before handling*

# New 3-Strand Mill in California Delivers Rods at Mile-a-Minute

COMPLETION and full-time operation of Columbia Steel Co.'s new continuous rod mill at Pittsburg, Cal., marks another finished step in the United States Steel Corp.'s $700,000,000 war expansion program. Operation of the mill substantially adds to U. S. Steel's increasing finished steel facilities in the Pacific Coast area.

The new mill, "most modern continuous-type built for 3-strand rolling in the United States," produces rods at great speed. Rods produced from billets, 30 feet long, weighing 600 pounds, pass through the last finishing stand to the reels at a rate of 48 miles per hour. At this speed, size No. 3 rod nearly a mile long is delivered to the reels in about a minute from the time the billet leaves the suspended arch-type furnace.

Operation of the mill, which furnishes rods to the adjacent Columbia Steel wire mill, now humming day and night to fill wartime orders, is continuous from the time the cold billet enters the furnace to the placing of the finished bundle of rods on the shipping platform.

Standard billets, 30 feet long, are fed one by one into the upper end of the 33 x 50 foot furnace, pushing the entire row of billets down the inclined furnace bed. The furnace has an hourly heating capacity of 50 tons of billets, insuring a steady flow. All steel heating operations are automatically controlled from fuel mixture ratios to the temperature of the heated billet.

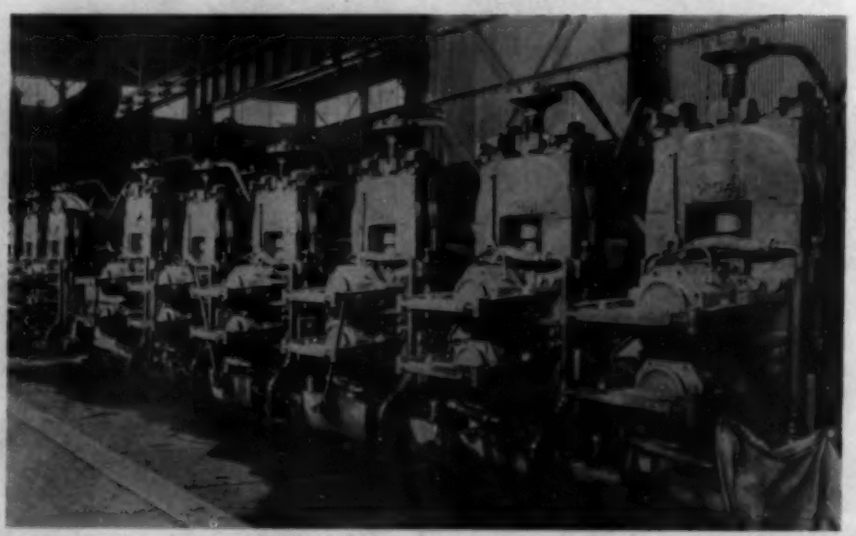
Billets are heated slowly and uniformly until reaching the proper rolling temperature and are then pushed out, one by one, from the lower end of the furnace into the "bite" of the rolls of the first nine roughing stands. In all, the mill has 21 stands, divided into nine roughing stands, six intermediate roughers and six finishing stands.

After leaving the final finishing stand, the rod passes through water-cooled connecting pipes to the reels. From the reels, the finished bundle of rods is switched onto an apron conveyor and headed toward the loading platform. At the end of this conveyor, bundles transfer automatically to a hook-carrier conveyor, designed to cool the rods before handling.

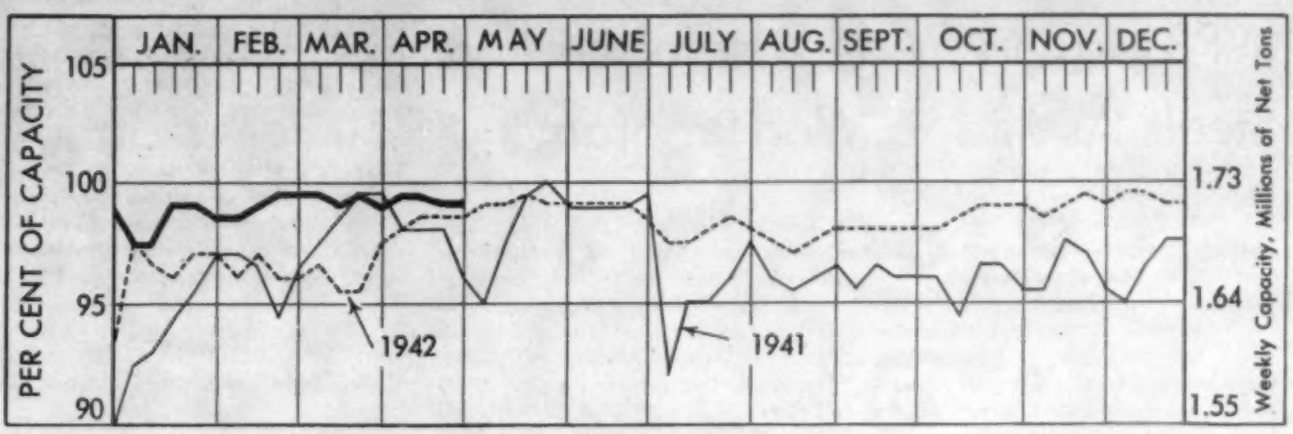
Rod bundles are removed from the hook conveyor by manually-operated air hoists and placed on stands. Groups of coiled rods then are picked up from the stands by tractors and loaded on specially constructed flat cars for transfer to the wire mill.

The new rod mill is a complete separate unit from the rest of the rolling mills and is served by its own auxiliary equipment. The roll shop for shaping and renewing the rolls is entirely modern in every respect. Seven of the nine main drive motors are housed in a separate motor room, which is air conditioned to remove the heat of the motors, protecting them from dust and other abrasives in the air. A water recirculating system is provided, made up of a settling tank, a clari-floculator tank, cooling tower, and suitable pressure pumps for returning the water to the mill, so that only make up water is required.

A quick roll change feature of the new rod mill is the conventional type of wobblers with the innovation of built-in



*New continuous rod mill at Pittsburg, Calif., has 21 stands, divided into nine roughing stands, six intermediate roughers and six finishing stands. The first nine roughing stands are shown in this picture*




STEEL INGOT PRODUCTION BY MONTHS

Net Tons, 000 omitted

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1943 | 7,408 | 6,811 | 7,670 | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 1942 | 7,124 | 6,521 | 7,392 | 7,122 | 7,386 | 7,022 | 7,148 | 7,233 | 7,067 | 7,584 | 7,184 | 7,303 |
| 1941 | 6,922 | 6,230 | 7,124 | 6,754 | 7,044 | 6,792 | 6,812 | 6,997 | 6,811 | 7,236 | 6,960 | 7,150 |

PIG IRON PRODUCTION

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1943 | 5,194 | 4,766 | 5,314 | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| 1942 | 4,983 | 4,500 | 5,055 | 4,896 | 5,073 | 4,935 | 5,051 | 5,009 | 4,937 | 5,236 | 5,083 | 5,201 |
| 1941 | 4,666 | 4,206 | 4,702 | 4,340 | 4,596 | 4,551 | 4,766 | 4,784 | 4,721 | 4,860 | 4,707 | 5,014 |

universal drives on the coupling boxes and spindles, which minimizes loss of time for roll changes and promotes smooth vibrationless running of the mill.

Other mechanical features of the new mill are:

1—The mill rolls are carried by fabric and ball thrust bearings adapted to the requirements of the job, according to the most recent experience in rolling mill equipment.

2—The size of rod ordinarily produced in the mill is 4½ gage, but the mill is capable of producing No. 5 gage up to and including 1-inch coiled rods.

3—The control pulpit operator controls the speed, keeping the entire mill synchronized.

4—Rods are delivered from the finishing end of the mill at a maximum rate of 4200 feet per minute.

## Northwest Seeks WPB Steel Plant Approval

Erection of a steel plant in the Pacific Northwest, possibly at Everett, Wash., is being urged before the War Production Board by George E. Murphy, Portland, Oreg., president of the Portland Spar Co., and identified with Pacific Coast steel and iron interests. The proposed plant is outlined by H. A. Brassert, steel plant designer, as having annual capacity for 170,000 tons of pig iron, 200,000 tons of steel ingots, 75,000 tons of structural steel and plates and 30,000 tons of merchant bars.

War Production Board is asked to release 15,000 tons of steel and equipment for construction of the plant, which is planned to be in operation within a year if permission is given. It has been suggested that power from Bonneville Dam be utilized for the new plant.

## DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

| | Week ended Apr. 24 | Change | Same week 1942 | Same week 1941 |
|---|---|---|---|---|
| Pittsburgh | 98.5 | None | 95.5 | 96 |
| Chicago | 98.5 | —2 | 104.5 | 96 |
| Eastern Pa. | 94 | None | 94 | 96 |
| Youngstown | 95 | —2 | 94 | 94 |
| Wheeling | 88.5 | —4.5 | 82.5 | 88 |
| Cleveland | 95 | +3 | 87.5 | 92 |
| Buffalo | 93 | +2.5 | 93 | 90.5 |
| Birmingham | 100 | None | 95 | 90 |
| New England | 95 | —5 | 85 | 92 |
| Cincinnati | 97 | +4 | 87.5 | 92.5 |
| St. Louis | 93 | None | 93 | 98 |
| Detroit | 96 | None | 87 | 79 |
| Average | 99 | None | *98.5 | *96 |

*Computed on bases of steelmaking capacity as of those dates.

# Ingot Rate Steady At 99 Per Cent

Production of open-hearth, bessemer and electric furnace ingots last week was unchanged at 99 per cent. Three districts advanced, four declined and five were unchanged. A year ago the rate was 98½ per cent; two years ago it was 96 per cent, both based on capacity as of those dates.

Changes were brought about entirely by taking furnaces off for repair and relighting others reconditioned for production. Scrap no longer is a factor in steelmaking activity.

## MARCH PIG IRON OUTPUT HIGHEST EVER RECORDED

Pig iron production in March made an all-time record with 5,314,201 net tons, exceeding by 77,593 tons the prior high mark set in October, 1942, with 5,236,608 tons, according to statistics of the American Iron and Steel Institute. The March tonnage was made up of 5,247,792 tons of pig iron and 66,409 of ferromanganese and spiegeleisen. In March, 1942, total was 5,055,898 tons.

For first quarter this year production was 15,290,952 tons, compared with 14,527,626 tons in the corresponding period in 1942. In March the industry operated at 98.7 per cent of capacity, compared with 98 per cent in February and with 98.8 per cent in March, 1942. For first quarter production was at an average of 97.8 per cent, against 97.7 per cent in first quarter last year.

| District | Net tons: Annual capacity | Pig iron | Ferro, spiegel | Total | Per cent capacity |
|---|---|---|---|---|---|
| Eastern | 12,868,680 | 963,651 | 25,666 | 989,317 | 90.5 |
| Pittsburgh-Youngstown | 25,732,160 | 2,215,100 | 21,407 | 2,236,507 | 102.3 |
| Cleveland-Detroit | 6,125,110 | 524,229 | .... | 524,229 | 100.7 |
| Chicago | 13,081,540 | 1,109,799 | .... | 1,109,799 | 99.9 |
| Southern | 4,425,340 | 351,435 | 19,336 | 370,771 | 98.6 |
| Western | 1,134,100 | 83,578 | .... | 83,578 | 86.7 |
| Total | 63,367,130 | 5,247,792 | 66,409 | 5,314,201 | 98.7 |

During 1942 the companies included above represented 99.8 per cent of the total blast furnace production.

# WPB Urging Wider Use of NE Steels As Aid to War Program

PRODUCTION of NE steels is increasing rapidly as consumers ascertain how and in what applications they can use them. The greatest progress so far has been made in the aircraft industry where the Army and Navy, after getting assurances from the various contractors, have approved their use in the fabrication of component parts.

The Steel Division of the War Production Board now is taking steps to encourage other consumers to make greater use of NE steels. In a letter to some 300 miscellaneous users of conventional SAE-AISI steels that was sent out on April 16 it was requested that these consumers notify their steel suppliers to melt their requirements for May and future months in alternate NE grades.

This letter is particularly interesting in that it explains the basis of the NE analyses.

**Triple Alloy Steel Solves Problem**

"In the production of war machines," the letter states, "a smaller amount of the ingot weight is utilized than in the production of peacetime equipment. This then results in a large increase in solid scrap and turnings to be absorbed. The logical answer to the problem of conservation of alloys and utilization of alloys was the triple alloy steel"—by triple alloy steel is meant nickel-chromium-molybdenum compositions.

Of all steel made in 1942, the letter states, 31.1 per cent was of alloy grade. In March of 1943 it was about 16 per cent. In normal time of peace the percentage varied between 5 and 6 per cent. The NE steels, therefore, are not only an answer to consumer requirements but they afford a vehicle for absorbing the large amounts of scrap that are produced in the war program.

Most consumers who have been encouraged to adopt NE alternates have sought to co-operate. Some, however, complain loudly because they cannot get the analyses to which they are accustomed. Those in charge of the program say that these consumers are crying "wolf" and that their attitude of non-co-operation is the equivalent of sabotage in the war effort.

The official attitude is that these consumers can find in the NE steels satisfactory substitutes for the alloy compositions they have been using. It is merely a matter of investigating the various NE compositions and their characteristics and of utilizing the proper heat treating procedure. Substantially the only exceptions the Steel Division is willing to consider have to do with highly stressed parts such as large gun barrels and other highly specialized equipment. Experience has proven that in nearly all cases one or another of the NE steels proves acceptable.

In quite a few cases consumers report that they like the NE alternates better than the steels they formerly used.

## 16 Per Cent of All March Steel Output of Alloy Grade

Sixteen per cent of all steels produced in March were of alloy grade—about three times the peace time percentage —H. G. Batcheller, director, WPB Steel Division, announced.

Despite the increased production, larger demands traceable to expanded production of war machines necessitate strict conservation of the alloying elements, Mr. Batcheller said in a letter to all alloy steel producers.

After examining all proposed melting schedules for next month, the Steel Division has suggested the use of the National Emergency Alloy Steels in many instances. Producers have been asked to notify the Steel Division if they are unable to comply with specific suggestions made in each case.

## Steel Co. of Canada's First Quarter Output Reduced

*TORONTO, ONT.*

Ross H. McMaster, president, Steel Co. of Canada Ltd., states that his company's production and sales in first quarter this year failed to equal those of the corresponding period last year. This is attributed to reduced tonnage of semi-finished steel available and to stoppages for repairs in departments which had operated continuously since the beginning of the war. Production was hampered also by unusually severe winter weather.

However, with additional capacity provided by new electric furnaces scheduled to go into operation in May, aggregate tonnage in 1943 is expected to exceed that of 1942 by a fair margin. He stated that restrictions by the government forced the company to devote its entire iron output to steelmaking and withdraw entirely from sale of merchant pig iron. Production of galvanized sheets was cut to half the normal volume and substantial reductions were made in galvanized pipe, barbed wire, field fence and other wire products, and sales of chain link fence were prohibited.

Because of these restrictions and preference given to alloy bars, plates and essential war requirements, operations of many departments were curtailed.

## Furnace Ends Seven-Year Campaign on One Lining

Blowing out of No. 8 blast furnace stack at South Chicago Works of Carnegie-Illinois Steel Corp. April 7 for relining ended a record-breaking production performance for the company's Chicago district. The stack operated seven years on one lining and in that period produced almost 3,000,000 tons of pig iron. With the exception of minor mechanical repairs the furnace operated continuously over this entire period.

In July, 1942, the blast furnace at the South Chicago Works produced nearly 5000 tons more than had been poured in any month in the plant's history.

## Industry Can Implement Nation's Farmers in 1943 and 1944, IF . . .

Modification of WPB's limitation order for 1943 to permit farm equipment makers to step up production of machinery for the enlarged food program came too late in the year for the situation to be more than partially corrected, Fowler McCormick, president of International Harvester Co., Chicago, stated last week.

Mr. McCormick said from 60 to 120 days are required to get steel and other materials, turn them into finished machines and ship machines to the places where the government orders them to be sent. He said that 1943 production of tractors and harvesting machinery could be substantially increased if material is allocated for critical component parts. Thus far, he pointed out, sufficient quantities have not been available.

Looking ahead to farmers' machinery needs in 1944, he said the industry can produce enough machinery to meet all requirements if the following things are done:

If the government draws up its 1944 production program in accordance with the needs of farmers; if it makes that program definite and effective in the immediate future; if distribution down to retail level is fitted to the needs of the food program and carried forward in a spirit of co-operation; if the government will provide the needed materials regularly and on time.

# Maritime Commission Awards Contracts for 469 Cargo Vessels

CONTRACTS for the construction of 469 merchant ships, including 189 new design "Victory Ships" as well as 206 high speed tankers, were announced last week by the Maritime Commission.

The new vessels, all of which will be completed by the end of 1944, will be constructed in shipyards in all parts of the United States. New contracts mark the first to be awarded for the construction of "Victory Ships" which will supplant the familiar Liberty ship as the principal emergency type in the commission's program.

Although of approximately the same deadweight tonnage as the Liberty, the "Victory Ship" will be larger and considerably faster than its predecessor, and turbine propulsion will be installed in many of them.

Announcement of award of contracts for the new vessels coincided with a revelation by the Senate Truman committee that submarine sinkings over the past year averaged 1,000,000 tons a month and exceeded new construction by American and British yards.

Contracts awarded call for the construction of 189 "Victory Ships". California Shipbuilding Corp., Wilmington, Calif., will construct 84, and the remaining 105 will be built by the Oregon Shipbuilding Corp., Portland, Oreg.

Aside from the "Victory Ships" and high-speed tankers, contracts also were awarded for the construction of 27 C-2 cargo vessels, 10 C-3 vessels, and 37 Liberty ships, the latter being awarded to round out production until such time as materials and equipment are available in quantity for the rapid scheduled construction of "Victory Ships".

List of yards, number and type of ships to be constructed under the new contracts follows:

Marinship Corp., Sausalito, Calif., 36, tankers.

Kaiser Co., Swan Island, Portland, Oreg., 47, tankers.

Kaiser Co., Vancouver, Wash., 48, tankers.

California Shipbuilding Corp., Wilmington, Calif., 20, Liberty, and 84, Victory.

Oregon Shipbuilding Corp., Portland, Oreg., 17, Liberty, and 105, Victory.

Sun Shipbuilding & Dry Dock Co., Chester, Pa., 75, tankers.

Ingalls Shipbuilding Corp., Pascagoula, Miss., 10, C-3.

North Carolina Shipbuilding Co., Wilmington, N. C., 27, C-2.

---

California Shipbuilding Co., Terminal Island, Calif., last week launched its 167th liberty ship, JUAN FLACO BROWN, after 27 days on the Calship ways. Sponsor was Mrs. Donald I. Brass, wife of a Calship layout man. The southern California organization is reported to be affiliated with the widespread Henry J. Kaiser enterprises and is headed by S. D. Bechtel, president, and John A. McCone, vice president, founder members of the engineering firm of Bechtel, McCone & Parsons, Los Angeles.

## Welders, Work Faulty, Charged with Sabotage

Arrest of ten welders charged with sabotaging ships under construction by faulty welding at the Bethlehem-Fairfield yard, Baltimore, raises the question as to the possibility of similar situations at other yards. Consensus among shipping men is that faulty welding and shoddy work are not generally prevalent.

One welder at Fairfield was sentenced to 18 months by Federal Judge William C. Coleman. Nine arrested in a two-day roundup by the Federal Bureau of Investigation were held in $5000 bail each for a hearing April 22 before United States Commissioner James K. Cullen.

George A. Steele, formerly of Franklin Furnace, O., was convicted of improperly welding a total of 660 inches of ship steel. At his trial, the defense contended that he did not intentionally commit sabotage but was attempting to increase his wages. At most yards welders are paid an hourly rate plus bonuses under certain conditions. Many shipyards have expanded to such an extent that new and inexperienced personnel is much greater than the old and experienced crews.

—o—

**SECRETARY of Navy Frank Knox, who visited Syracuse, N. Y., April 17 to inspect General Electric Co.'s new plant where turbine electric power plants are produced for destroyer escort ships, paid high tribute to the company and its employes. Above, a glass replica of a submarine, used instead of the traditional bottle of champagne to christen the "land ship U. S. S. Knox" pleases Mrs. Knox and Secretary Knox (right). Gerard Swope, company president, looks on while J. W. Belanger, manager of the company's Federal and Marine Division, holds the sub. In the lower illustration employes throng the turbine shop to watch the "christening"**

# New Co-operative Program Formed To Aid Small Manufacturing Plants

*CHICAGO*

A TWO-POINT program has been devised to furnish quick relief of actual distress among smaller manufacturing plants. This program not only includes a much wider and intensive use of subcontracting but provides new and tested means of facilitating subcontracting.

It is a co-operative program, involving active collaboration between the Smaller War Plants Corp., the National Association of Manufacturers, National Industrial Council, Midwest Manufacturers' Associations Inc. and all state industrial associations and manufacturers. The program was announced by Col. Robert W. Johnson, chairman, Smaller War Plants Corp., and vice chairman, War Production Board, at the twenty-eighth annual dinner of the Illinois Manufacturers' Costs Association in the Palmer House, Chicago, and will go into effect immediately.

**Revolves Around Prime Contractors**

The program revolves around the prime contractor, who in reality now is the nation's principal procurement agency. This is so because the armed services already have placed with the prime contractors the bulk of the war program orders.

The first step in the collaboration program is to utilize the facilities of both organizations to determine the extent of distress now existing.

The second step is to aid the prime contractor in his subcontracting efforts by making available to him devices designed to bring together the prime and subcontractor. This collaboration will be implemented by having a representative of the N.A.M. assigned to full time duty in the SWPC Washington headquarters serving in similar capacity to corresponding representatives from Army and Navy.

The task of getting prime and subcontractor together is approached from two angles. One is through an instrument called the Smaller War Plants' Register. The register is a list of distressed plants showing their capabilities to handle a contract; their inspection record and similar pertinent data. The register is distributed to prime contractors who readily can note in this alphabetically arranged list, broken down into regions, just what plant is available to do a certain job.

The other approach is through the Directory of Contract Opportunities. This is the directory plan which was tested last summer in Chicago with successful results. In the directory the prime contractor lists, in exact terms of machinery required, the jobs which he wishes to subcontract. This list is circulated among subcontractors who can eliminate themselves or attempt to qualify for any job offering.

It is felt that with these aids, plus the exigencies of the war production program, a tremendous increase in the amount of subcontracting can be achieved. Subcontracting already is at a very high level. A program is being developed for the limited resumption of the manufacture of specific essential civilian products. This may be an added impetus for subcontracting.

Colonel Johnson said it is not the duty of the Smaller War Plants Corp. to solve directly the problem of the retail merchant nor its responsibility to aid in the building of new manufacturing facilities, except as these may contribute to the widespread use of new unused small plants. A distressed plant is defined as "one operating at less than 66-2/3 per cent of its normal capacity" which in turn is defined as "the five-year average production before the war, or the 1941 volume adjusted to the Department of Commerce index figure."

For the exceptions where this yardstick does not apply, the Smaller War Plants Corp. will appraise the distress status of a plant by the rules of good business, common sense and such appraisals must carry the approval of the examining engineer and of the chief of the field office making the appraisal. The corporation defines small business as "any unit of manufacture and production doing, in normal times, a relatively small percentage of the total national volume of the specific industry."

## Manufacturers of Aluminum Castings Study Regulations

Seventy-five manufacturers of aluminum sand castings and permanent-mold castings, representing 13 states from Massachusetts to Iowa, in Chicago, April 21, discussed new and significant government regulations affecting production of these critical war products.

The meeting was sponsored by the Aluminum Foundry Division of the Aluminum Association.

Chief discussion centered around interpretation and clarification of the revised maximum price regulation No. 125 issued recently by OPA and CMP, with brief explanations by government officials. L. E. De Groat, sales manager, Permold Co., Medina, O., was chairman.

A proposal to form committees representing the nation's aluminum foundries was given favorable consideration. The group's secretary is accepting suggestions for personnel to constitute the committees.

## Aviation Gasoline Program Metals Requirements Heavy

Because wartime censorship prohibits publication of information as to the size of the 100-octane aviation gasoline program, the Petroleum Administration for War is unable to announce how much metals will be required for plant construction. PAW, however, has broken down the figures to show use of metals needed to set up capacity for producing one barrel per calendar day.

To accomplish this, erection requirements on the plant site are 2.42 tons of carbon and alloy steel, 0.02 ton of nonferrous metals and 2.30 tons of other materials. In addition, equipment shipped to the plant site and installed there requires 2 tons of carbon and alloy steel, 0.89 ton of nonferrous metals and 0.78 ton of cast iron.

Tonnage erected on the plant site largely is in the form of plates, shapes, tubular products, some bars used mainly for studs, and small quantities of cold-finished bars. Included also is a considerable tonnage of concrete reinforcing bars. These materials are used for such equipment as heaters, tankage, piping, building foundations, etc. Manufactured equipment shipped to the site consists of items like pressure vessels, boilers, compressors, pumps, motors, heat exchangers, etc.

Nonferrous metals include copper wire for electrical transmission, admiralty brass tubing and a small amount of brass in other forms. Cast iron is in the form of engine and pump castings, parts in bubble towers, compressor cylinders, etc. Included also is a considerable amount of cast iron pipe for construction of water and drainage pipe.

Above quantities represent an average for the needs of the Fluid, Thermofor and Houdry catalytic cracking units as well as alkylation and isomerization units.

Average 100-octane plant involved in the program has capacity for around 4000 barrels per calendar day.

---

Inventions originated by the Westinghouse Electric & Mfg. Co. during 1942 increased 30 per cent over 1941.

# Politics Seen as Motive in Trade Pact Renewal Controversy

CURRENT controversy over extending the Reciprocal Trade Agreements Act for another three-year period, or of allowing it to expire in June, is motivated by politics. The original act, which became effective June 12, 1934, was renewed in 1937 and again in 1940. It is a product of New Deal thinkers and is one of the pet schemes of the Roosevelt administration and of Secretary of State Cordell Hull. Hence, Republican members of Congress in general are automatically opposed to the policy.

The history of our foreign trade tends to prove that the Reciprocal Trade agreements program has been beneficial, and that there is no factual basis for the controversy on this point. Originally conceived to arrest the serious decline in our foreign commerce and to check the growing nationalism and trade wars among nations, it seems to have served that purpose effectively.

In 1938 and 1939, the two years immediately before the war, exports to the 16 countries with which agreements were in effect averaged in value 63 per cent more than in 1934 and 1935, the two years immediately before the program really got under way. Exports to all other countries averaged only 31 per cent higher. Similarly, United States imports from the 16 trade-agreement countries averaged 22 per cent higher in value, against an average increase of only 11 per cent for the other countries.

The record reveals that in the period following enactment of the Hawley-Smoot tariff act in 1930, our foreign trade declined more rapidly than did that of the rest of the world; the loss was nearly 70 per cent in value—from $9,640,000,000 in 1929 to $2,934,000,000 in 1932.

In a recent speech, Under Secretary of State Sumner Welles declared that we won World War I but made no effort to win the peace.

"Our Allies are asking themselves now whether we will again follow the same course," he said. "In a very real sense the decision that will be made with regard to the renewal of the trade agreements act will be regarded by peoples throughout the world as an acid test of our future intentions. They will see in that decision a clear indication as to whether the people of the United States have determined upon a policy of international co-operation for the future, or whether they will once more turn back to that road of isolation which leads to inevitable disaster," he added.

The act is very specific in outlining the manner in which the State Department may enter into trade agreements with other countries. For example, no agreement to a concession may be concluded until after the Tariff Commission and such departments as Commerce, Treasury and Agriculture have been consulted and public hearings have been held to enable those engaged in agriculture or industry to present facts and register their opinions.

## Steel, Copper Allocated For Auto Replacement Parts

Additional allocation of materials for automotive replacement parts for the second quarter will give the industry almost 100 per cent of the amounts requested for that period.

Eighty-five per cent of the alloy steel requested by the industry for the second quarter of 1943 has now been allocated. The industry has also received the full requested amounts of carbon steel and copper, with the exception of copper wire. Allocation of copper wire was 90 per cent of the amount requested.

## WPB Requires Use of Low-Grade Chromium Ores

Ferrochromium producers have been instructed to use specific proportions of low-grade ores in a directive issued under order M-18-a. The directive requires each producer of high-carbon ferrochromium to use ores having a weighted ratio to iron of 2.6 to 1. This is practically one ton of low-grade chemical ore to about four tons of high-grade ore, or to use natural ores having lower than that ratio. The restrictions are expected by officials of the Ferroalloys Branch of the WPB Steel Division to result in the production of high-grade chrome containing about 65 per cent chromium.

## Electronic Supply Agency to Determine Delivery Sequence

Electronic Research Supply Agency, which will provide radio laboratories serving the Army or Navy with critical components not quickly available elsewhere, will not be required to accept orders on the basis of their ratings, according to a directive to the agency just issued by C. E. Wilson, vice chairman of the War Production Board.

The agency has not been fully set up administratively and is not yet engaged in actual operations.

Based upon directions to be given by the Army, the Navy, the Office of Scientific Research and Development and WPB, the agency itself will work out the sequence in which orders on it will be filled. In dealing with its own suppliers, the agency will be assigned ratings by WPB or will extend the ratings of its customers. It is authorized to apply for priorities assistance or allotments on approved forms.

The agency was organized for use of electronic laboratories whose needs could not be supplied on time in commercial channels. Laboratories are expected to continue to draw upon their usual suppliers to the fullest extent, using the agency only for last resort.

## List of Critical Materials Revised

Ferrous materials remained in relatively unchanged supply in the latest list of critical materials issued last week by WPB.

In the nonferrous group, cadmium, tin and bismuth were reported tighter.

In announcing the list, WPB stressed the need of using less scarce substitutes for all critical materials where practical.

Steel ingot supplies were reported sufficient for war needs and for essential civilian requirements where required for safety. Most critical in iron and steels are chrome-nickel stainless in steel products, bars 1½ inches and up, forgings, seamless tubing and plates are critical.

## Tool Steel Order Amended To Provide Flexibility

Tool steel order, M-21-h, has been amended to provide more flexibility in the requirement that a certain percentage of all high-speed steel orders be of molybdenum types instead of the previous requirement that 75 per cent of all high-speed steel orders accepted in any calendar quarter be of this class and not more than 25 per cent be of the Class B or tungsten type.

The order allows a 5 per cent variation in delivery weights by calendar quarters.

## Third Quarter Steel Allocations Will Be Announced About May 1

Requirements committee of WPB will be ready May 1 to announce third quarter steel allocations. The Iron and Steel Requirements committee has made its recommendations to the overall committee.

# WINDOWS of WASHINGTON

## Add War Casualties

AUSTRALIAN War Supplies Procurement continues to swell in size. Originally it was quartered at 1700 Massachusetts avenue. Subsequently it also occupied the buildings at 1707, 1708, 1709 on the same thoroughfare. Now it is expanding into a fifth building—the famous old DuPont mansion at 1711 Massachusetts avenue. Stripped of its fine furniture and luxurious trappings, it still suggests the grandeur of life of the upper crust in a departed generation.

War casualities include the old McLean, Sumner Welles, Perry Belmont, Woodward, Mellon and about a dozen other famous Washington mansions which formerly employed retinues of servants and which were among the Capital's show places. The Perry Belmont residence, where once such figures as the Prince of Wales were guests, now is a de luxe boarding house. In addition, many swanky apartment houses and many residences in the fashionable sections of the city now are used as offices or as residences for war workers.

## Physicists' War

Whereas World War I was characterized as a chemists' war, because so many chemists were needed for gas-warfare development, this present conflict is the physicists' war, said Dr. Lyman J. Briggs, director, National Bureau of Standards, when he appeared recently before the House Appropriations Committee.

The entire staff and facilities of the bureau are being devoted to war work. Its research men are working on problems assigned to them by the Army, the Navy, the Office of Scientific Research and Development and other war agencies. Its testing group is working on testing of instruments and materials for the armed services and for manufacturers who need calibrated instruments in the production of munitions. Its simplification and specification groups are overloaded with such work. Its production group is manufacturing a large quantity of optical glass of the finest quality for the Army and the Navy. The bureau is flying the Army-Navy E pennant with two stars.

War Department has made the bureau grounds a prohibited zone. The grounds are completely fenced with woven and barbed wire, the public street through the grounds has been closed by order of the Secretary of War and the entrances are protected by armed guards.

New materials testing laboratory of the bureau has been completed and is in operation. An interesting development is the purchase by the War Department of a site in Loudoun County, Va., 26 miles from Washington, where the atmosphere is practically free of electrical disturbances. There the bureau has a radio-receiving station which makes measurements that are used widely by the armed services.

## Steel Cartridge Cases

From a stumbling start the steel cartridge case program now is going along with complete success. Seventy-nine manufacturers now have contracts for making steel cases; the four or five who did the experimental work have imparted full information to the newcomers in the field and the latter thus are in a position to go about filling their contracts without making any false starts. Number of sizes of cases being made rapidly is growing. Preparations now are underway to make cases for small arms ammunition of steel, also cases for artillery shell, easing pressure on copper.

## Oil-Coal Fuel Tested

Now being tested under boilers at a plant in Philadelphia is a new colloidal fuel obtained by mixing pulverized coal and oil. A development of the United States Bureau of Mines, the fuel consists of 40 per cent coal and 60 per cent oil. Tests to date have been "very satisfactory".

If final judgment is favorable, three desirable objectives will have been attained. First, from a humanitarian standpoint, the new fuel is heavier than water so that when a tanker containing it is blown up by a torpedo the fuel will sink instead of blazing on the surface and destroying the surviving seamen.

The development also would ease the critical shortage of oil that threatens for 1945. It further would ease the fuel oil situation in the Eastern states.

In a report to Representative Hartley, New Jersey, the bureau expressed hope the new fuel would permit saving of 15,000,000 barrels of oil ashore. It estimated that some 25 plants would be required to prepare the fuel and that the equipment required would come to around $3,125,000. The bureau does not regard the new fuel as strictly a war measures. Its introduction, the Bureau of Mines believes, will prove to be a completely justified conservation effort.

## Wanted: Portable Machinery

A big problem in obtaining increased quantities of a number of forest products from South America is the development of portable machinery which can be taken where the products are grown, according to Dr. Ross E. Moore, assistant director, Office of Foreign Agricultural Relations, State Department.

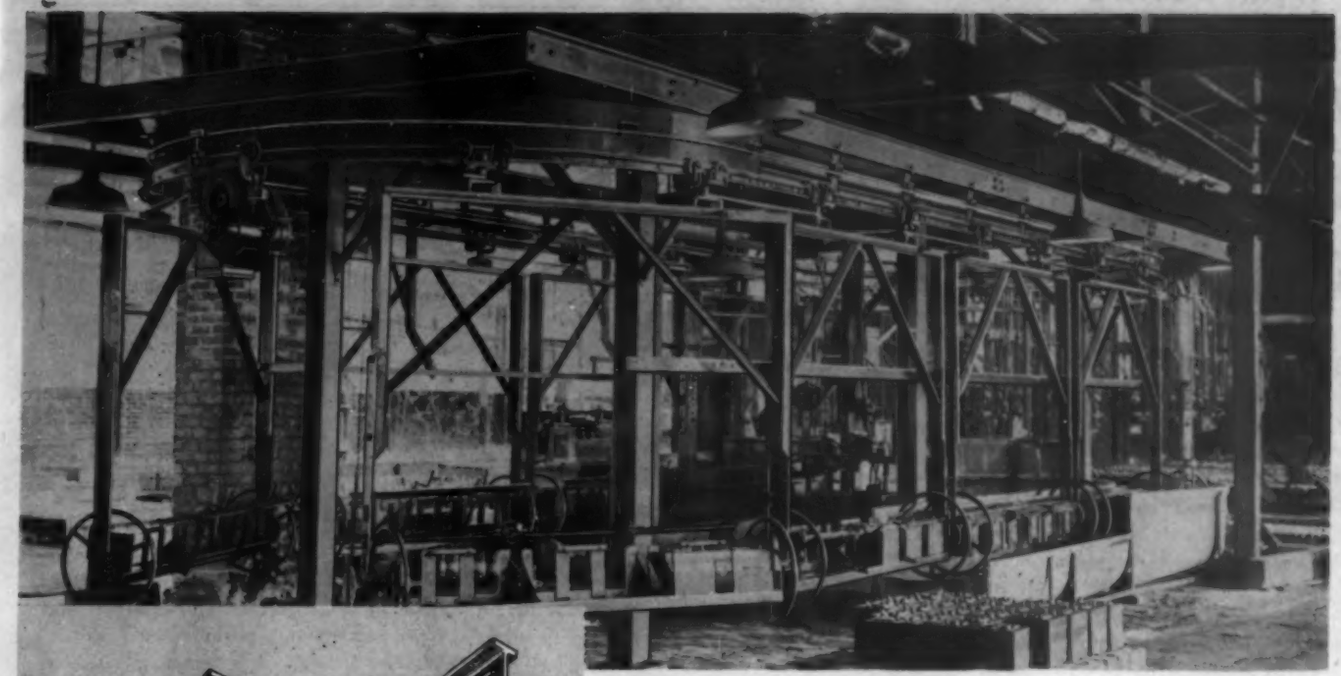
As an example, he mentioned nuts from babassu trees that grow wild in the Amazon valley. The problem is to get in portable machines that will crack the nuts and squeeze the oil from them.

Milton J. Lobell, associate fishery engineer, Fish and Wild Life Service, State Department, says that as soon as the emergency permits there will be a demand for equipment to refrigerate fish caught in the Amazon river. Fish constitute practically the only protein food immediately available to rubber and other workers in that area and he intimated that in view of our proposed policy of relying upon South America in the post-war period the long-range outlook for a market there is good.

■ **ALUMINUM MOST CRITICAL . . .** Degree of criticalness of the strategic metals varies from time to time. Most critical metal now is aluminum, followed, in this order, by cadmium, bismuth, tin, magnesium, copper, and zinc.

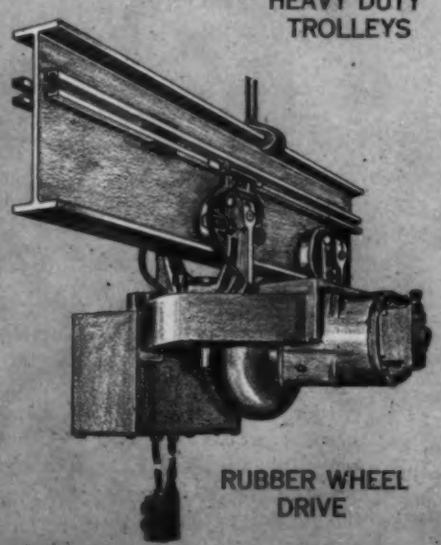
■ **BOOSTS EFFICIENCY . . .** Findings of the Public Health Service as a result of studies last summer in New York and elsewhere show that where air conditioning equipment has been installed the productive capacity of workers was increased from 20 to 25 per cent.

■ **SUGGESTIONS APLENTY . . .** On the average, the National Inventors Council receives between 250 and 300 suggestions a day, according to a statement at a recent House committee hearing by Condor C. Henry, assistant commissioner of patents. These are evaluated as rapidly as possible—and this presents a difficult problem in view of the difficulty of obtaining the services of competent engineers who are scarce because of the war need for so many of these specialists. Between 4 and 5 per cent of the suggestions examined prove to have some potential value, in considerable testimony off the record it was made entirely clear that the activities of the National Inventors Council, in co-operation with the armed services and with other agencies having to do with the war program, are among the most important of the program.



FREE MOVING
GLIDE SWITCH

HEAVY DUTY
TROLLEYS



RUBBER WHEEL
DRIVE

# *Extreme Flexibility*

## OFFERS VERSATILE APPLICATIONS

DON'T let your handling problems impede your war efforts. The production front is all important. But, even NOW you can keep your eye on the future—that post-war period that presents another conversion problem.

American MonoRail Overhead Handling Equipment is extremely flexible. It offers versatile application without costly adjustment or lengthy engineering. Standard parts fit quickly into complete systems.

Equip now for Victory—prepare now for later changes.

Let our engineers show you results obtained in hundreds of installations.

**THE AMERICAN MONORAIL CO.**

13102 Athens Avenue — Cleveland, Ohio

★

# 26,000,000 Workers Buy on Payroll System; Treasury Wants 30,000,000

UNITED States Treasury Department officials can see no sense whatever in the argument: "If I do not know how much money I will have to pay in taxes during the rest of this year, how can I be expected to buy more War Bonds?" They say that whether 1942 taxes are forgiven in whole or in part, or whether pay-as-you-go is adopted by Congress, it remains that money put into war bonds is money saved.

War bonds are redeemable in cash and already have been cashed in to make payments on income taxes. It is pointed out that in March, for example, during which month sales of E bonds aggregated around $750,000,000, the E bonds cashed in came to some $140,000,000 and the larger portion of this cash was used to pay the first quarterly installment on income taxes.

Anyway, the collectors of internal revenue throughout the country are part of the organization of the Treasury Department and it is pointed out that anybody buying bonds and not in a cash position to pay his income tax when due should have no difficulty in reaching an understanding with the collector in his district.

Treasury officials are not satisfied with the utilization of payroll deduction systems throughout the country for selling War Bonds. Some 26,000,000 individuals now are buying bonds under such plans; the number should be closer to 30,000,000 in order to take in all potentials. The Treasury is anxious that this matter be given full attention at every industrial plant.

Another point which Treasury spokesmen stress is that the average individual payroll deduction is 9 per cent—or less than the 10 per cent the Treasury wishes. It also is pointed out that this 10 per cent is a minimum and that individuals in all cases should be urged to arrange for larger deductions; they should be urged to convert as large a percentage of their income in War Bonds as they can afford.

Under payroll deduction plans the Treasury is selling bonds each month that come to a face value of around $400,000,000. The goal is $500,000,000.

For a number of months there has been some dissatisfaction at the Treasury over radio commercials that contain appeals to the public to buy more War Bonds. In many cases they are repetitious and are so worded that they quickly lose their appeal. In some instances they are of a character that might win ill-will rather than good-will. Unable to do anything more than make suggestions in such cases, the Treasury confines its comments to urging advertisers to make intelligent use of the air in broadcasting appeals on behalf of War Bond sales.

Treasury officials are highly pleased, in general, with the manner in which manufacturers carry war bond appeals in their printed advertisements in the business and trade press. Their only comment on this point is that it would be a fine thing if they devoted even more of their printed copy to emphasis of the importance of investing in bonds.

## Warnings on Regimentation Believed Over-Emphasized

Most manufacturers are members of trade associations with trained staffs here in Washington who observe and write reports on legislative and administrative trends. It is generally admitted that such services are well worth their cost since they permit industry to keep informed with the result that it can marshall its forces to protect its interests insofar as its efforts prove successful.

It long has been the opinion of this department that many of these reports to manufacturers are gloomier than the actual situation warrants and that many of them could be worded so as to keep manufacturers informed without unduly "scaring" them.

For example, a lot of warnings have been given to manufacturers recently through trade associations about the efforts of New Deal planners to utilize the opportunities during time of war to revolutionize old established business customs in the United States, not only during the war but in the postwar period.

It probably is true that a good many things developing during the course of the war will stick in the period ahead, but there is little ground for fearing that regimentation will be developed and retained in such matters as limiting manufacturers to local sales zones so as to eliminate or reduce cross-hauling, elimination of trade marks and brand names, extreme standardization and simplification, profit control of industry by government agencies—to mention only a few of the subjects in which manufacturers are currently interested.

A good deal of study is being given to the problem of reducing the amount of cross-hauling so as to relieve the railroads and the trucking system of some portion of their huge burden. Little has been accomplished so far and those in authority are looking to industry advisory committees of the War Production Board to devise ways and means whereby the elimination or reduction of

## STEELWORKS CREDIT UNION SUBSCRIBES FOR WAR BONDS

CREDIT union officers of the South Works, Carnegie-Illinois Steel Corp., a U. S. Steel subsidiary, subscribed $300,000 for the second war loan drive. The officers are shown with a sign explaining their aim. Irving S. Olds, United States Steel Corp.'s chairman, announced a subscription of $30,000,000 to the drive on behalf of the corporation and its subsidiary companies

crosshauling will provide the least shock to individual manufacturers and to the whole economy.

Nobody in authority in connection with the standardization and simplification program has given any indication that anything other than a strictly wartime program is under consideration, and nobody in authority has come out with a proposal to eliminate trade marks and brand names; in fact, the prevailing thought is that where manufacture of certain products may be "concentrated" in fewer plants during the emergency all existing trade marks and brand names must be preserved.

Furthermore, the present Congress is practically a unit in believing that wartime controls must be eliminated to the maximum degree when the emergency is over.

It is essential that manufacturers keep informed, but it is sound sense for them to be realistic.

## Tool Conservation Program Recommended by Coonley

Pointing out a large tonnage of critical alloys can be saved by increased emphasis on tool conservation throughout the metalworking industry, Howard Coonley, director, WPB Conservation Division, has recommended each war production plant make a study of its tool handling problems and adopt a company-wide tool care policy.

Such a policy would largely center around a strong tool handling educational plan in the plant training program for new employes. Necessity for training in tool care is becoming increasingly important as more and more "green" employes come on the job.

Many of the factors that result in tool breakage and spoilage are elementary in nature, can easily be avoided if clearly explained to workers. In handling twist drills, for example, the tight clamping of the parts to be drilled will help insure against uneven stress being placed upon the drill. A few extra seconds taken in "tightening" will keep an expensive drill in active service longer.

When there is breakage, broken tools often can be reclaimed. They can be cut up into smaller pieces that are used as cutting tips, brazed into shanks made of non-alloyed steel, thus conserving the critical alloyed steels that would otherwise be required. This is a practice that has been adopted already by many plants and can be handled by many more.

Widespread adoption of tool-tipping practices could mean a saving of 75 per cent of the 36,000 tons of "tippable" tools estimated as being needed in 1943. The cutting tool is actually the fulcrum of most war industry.

# Congress Committees Still Hostile; Want Oil Price Ceiling Raised

ALTHOUGH Prentiss M. Brown Jr. gets pretty good treatment at the hands of Congressional committees and subcommittees, and the feeling toward him in general is friendly, he is not allowed to escape without being made to realize that Congress still is hostile to the past policies of the Office of Price Administration. On April 16, for example, he was asked to testify before the Patman Small Business Committee which at the time was interested in the future existence of the smaller oil operators.

The committee had been informed previously that existing ceilings on oil prices are not sufficiently high to encourage the small operators to stay in business, also that we are using oil five times as fast as new sources are tapped—and that to locate more fields it is absolutely necessary to keep the small "wild cat" operators going. Mr. Brown was forced to answer a number of pointed questions and he had to state again and again that he would lose no time in correcting OPA "mistakes" as soon as he learned about them.

Sumner Pike, whose responsibilities include the freezing of oil prices, received much rougher treatment and the going would have been even worse for him were it not for the fact he has been with OPA only four months and therefore cannot be held accountable for the actions of his predecessors.

The Patman committee appears determined that the small people in the oil industry must have relief in the form of higher prices that will encourage them to go on drilling.

ARTHUR D. WHITESIDE

*Formerly head of the Iron and Steel Branch of the Office of Production Management, predecessor to WPB, who was appointed vice chairman of WPB in charge of the new division of Civilian Supply, as announced in STEEL, April 19, p. 65. He is president, Dun & Bradstreet*

On the same day Petroleum Administrator for War Harold L. Ickes told the committee there is a definite trend toward monopoly in the oil industry and that two years ago when he told OPA that we would encounter trouble if the oil price structure were not improved he was told callously by those then in authority at OPA: "Yes, many of these small companies will be forced out of business; they will be war casualties". Secretary Ickes testified that two years ago the 20 largest oil companies controlled 60 per cent of the oil industry and that now these same 20 companies control 70 per cent— a trend that will continue unless price relief is provided.

### To Encourage "Wildcats"

Indications are that pressure will continue behind the move to keep wild-cat operators in business, and to encourage those formerly in this business to return to it. This automatically would bring about an increase in the demand for supplies and equipment used in oil drilling and exploratory work.

The Patman committee also on more than one occasion has found evidence for criticizing the OPA because of basic principle involved in setting many prices, as on many foodstuffs—and that is by freezing prices at the retail level. Members of the committee say that this method "takes too much out of the hide of the little fellow" and must be supplemented by a better formula. In general the committee takes the attitude that the law makes it possible to make price increases when that is necessary to prosecute the war. The committee does not feel that killing off small business is a help in the prosecution of the war.

Incidently, when Sumner Pike was on the stand he was pressed hard for a statement as to how soon he could reach a decision on whether the price level on oil should be raised. Congressmen became increasingly impatient over his hesitancy in setting a definite period. Finally, after being sharply accused of side-stepping, he thought that the preliminary study could be completed in two months and that it would not be before another two months at least that anything tangible would result. This caused Representative Patman to explode: "That is the main objective to OPA—you delay and delay and delay. We want action!"

# PRIORITIES–ALLOCATIONS–PRICES

**Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide, published in Section II of STEEL, Dec. 14, 1942**

## CMP REGULATIONS

**No. 2** (Inventory Direction No. 5), issued April 15. Grants relief from inventory restrictions on tinplate to can manufacturers in Washington, Oregon, California and Utah. Permits manufacturers to carry a 90-day inventory of tinplate for making cans during the pickling season. Normal inventory limitation to a 60-day supply will apply after Sept. 30, expiration date of the exemption.

## E ORDERS

**E-5-a** (Amendment): **Gages and Precision Measuring Hand Tools,** effective April 17. Exempts following types of production gages from provision requiring that a purchase order must be accompanied by a certification that it does not increase purchasers' inventory beyond a 30-days' supply: round external gages, round internal gages, external thread gages, internal thread gages, snap gages, fixture gages and flat gages.

**E-10: Anti-Friction Bearings,** effective April 13. Requires producers to schedule their production, beginning June 1, 1943, for successive 90-day periods as follows: 85 per cent of each quarter's bearings must go to fill "production orders", defined as (1) Orders for one or more anti-friction bearings of one size having a total price of $500 or more; (2) Single orders or contracts for more than 500 bearings of any one size. Deliveries must be allocated monthly after June 1 on same basis: 85% to production orders and 15% to miscellaneous orders. Producers must submit reports of operations on forms WPB-1314 and WPB-2387. Production and delivery schedule percentages are subject to minor variations. Additional bearings may be produced to meet orders which may be reasonably anticipated within the 90-day period for which the schedule is prepared, or to make up a minimum practicable production run; purchase orders cannot be withheld from production or delivery on request of a customer and retain their place in the producer's schedules beyond a 10-day grace period. Preference ratings are required on all purchase orders other than those which come within provisions of L-158 (automotive replacement parts) or L-170 (farm machinery and equipment). Purchasers' inventories are limited to a 60-day supply or a minimum practicable working inventory, whichever is smaller.

## L ORDERS

**L-38** (Amendment): **Refrigerating and Air Conditioning Machinery and Equipment,** effective April 6. Permits a manufacturer or dealer to deliver on any purchase order for a system of refrigerating and air conditioning machinery and equipment or parts which the WPB authorized on forms PD-830 or PD-831; or which was placed with and accepted prior to April 6, providing such order bears a preference rating of A-1-c or higher.

**L-42** (Revocation of Schedule II): **Plumbing and Heating Products,** April 17. Revokes schedule which had established standards for production of grey cast iron, malleable iron, brass and bronze pipe fittings. Control transferred to order L-288. Does not affect operations of concerns subject to the order.

**L-43** (Amendment): **Motorized Fire Apparatus,** effective April 16. Imposes additional controls on manufacture and distribution of specified apparatus. Restricts use of critical materials to purposes enumerated in Schedule A. Prohibits installation of any bell which contains metal other than steel. Manufacturers must file monthly production and shipping schedules on form PD-774.

**L-45: Jewelry,** effective April 15. Restricts use of gold and palladium by large manufacturers in production of jewelry from April 15 to July 1 to 75% of amount used in like 1941 period; after June 30, use restricted to 50%. Exempts certain small producers from general production restrictions. Establishes additional amounts of gold and palladium which may be used in lieu of platinum. Manufacturers must file report on form PD-797 by April 30, showing 1941 use of these metals as well as amount used in first quarter of 1943. Similar reports must be filed by the 15th of each third calendar month thereafter.

**L-103-a: Glass Containers and Closures,** effective April 13. Prohibits purchases by commercial users of empty new glass containers which will increase inventories to more than either a 60-day supply or to more than two carloads of any particular item. The order expires Sept. 30. Order does not apply to: acceptance of glass containers which were in transit to a user's plant on April 18; glass containers for use in packaging fresh fish, shellfish, fruits, vegetables, or products from fresh fruits and vegetables.

**L-159** (Amendment): **Plastics Molding Machinery,** effective April 14. Exempts following from restrictions: fixtures in process of manufacture on March 26, provided they can be completed and delivered on or before May 1; small sample molds producing pieces of 30 grams or less; used fixtures.

**L-211** (Amendment): **Hand Trucks and Other Handling Equipment,** effective April 13. Limits acceptance of purchase orders for equipment or new parts to those rated AA-5 or higher. Repair parts are exempted but certification must be made that the parts will be used only for repair purposes. Prohibits use of following items and materials in specified types of equipment, with certain exceptions: ball or roller bearings, cast steel wheels, iron and steel, copper and copper base alloy, aluminum, tin, cadmium, zinc, stainless and chrome steel, and metallic plating and finishes. Manufacturers must file monthly reports with WPB on production and delivery. Exempts equipment in process of manufacture on April 23 or for orders accepted prior to that date; deliveries to or for direct use of the armed services until 90 days after the effective date of the order.

**L-288 Pipe Fittings,** effective April 17. Establishes sizes and standards for grey cast iron, malleable iron, brass and bronze pipe fittings, previously covered by Schedule II of order L-42. Operations of concerns subject to the order are not affected.

## P ORDERS

**P-134** (Revocation): **Copper, Zinc Mills,** effective April 15. Revokes order which had assigned preference ratings for the acquisition of repair and maintenance materials by producers of copper, zinc and alloys of those metals. Purchases now made under CMP Regulation No. 5.

**P-142** (Amendment): **Transportation Systems,** effective April 14. Requires use of form PD-844 to extend preference rating until they have applied for and received a serial number. Provides that until an operator receives his serial number under P-142, he may use on the certification which must accompany an order for maintenance, repair and operating supplies the CMP allotment symbol MRO-P-88 plus his serial number under P-88. Provides that to the extent that an operator continues to receive ratings and authorizations on form PD-351 for the second quarter of 1943, PD-351 shall be considered equivalent to PD-844.

## M ORDERS

**M-15-b** (Amendment): **Rubber,** effective April 13. Relaxes the procedure under which firms recovering copper from wire and cable were formerly required to reclaim the rubber content or make application for its destruction. Allows destruction of certain types of scrap rubber under special authorization. Permits manufacturers of rubber products to send rubber to other concerns for washing, drying and milling without first making application for the transportation of the rubber, provided actual title does not change hands.

**M-302** (Amendment): **Osmium,** effective April 16. Permits use of osmium metal only for manufacture of an osmium alloy for use in implements of war. Restricts use of osmium alloys manufactured or alloyed prior to April 16 to 50% of aggregate amount by weight of all osmium alloys put into process during 1941. All holders of any stocks of osmium alloy must report by 15th of month to WPB on form PD-846. Suppliers and consumers must also report inventories on PD-848 on or before May 30.

## U ORDERS

**U-1** (Amendment): **Electric, Gas, Water, and Steam Utilities—Materials,** effective April 17. Provides new certification form to be used by electric, gas, water and steam utilities on their purchase orders for maintenance, repair and operating supplies. The form is as follows: "Preference Rating AA-1, CMP Allotment Symbol MRO-U. The undersigned purchaser certifies, subject to the penalties of section 35 (A) of the U. S. Criminal Code, to the seller and to the WPB, that, to the best of his knowledge and belief, the undersigned is authorized under applicable WPB regulations or orders to place this delivery order, to receive the item(s) ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order." Preference rating assigned to U-1 may not be used to obtain materials on a new List E, attached to the order, including such items as automotive replacement parts, printing office equipment, and certain types of safety equipment.

## PRICE REGULATIONS

**No. 12** (Amendment): **Brass Mill Scrap,** effective April 21. Broadens definition of brass mill scrap to include all sales of unused sheet, tube, rod and other brass mill products by Copper Recovery Corp., Metals Reserve Co., or their agents, if such material was acquired originally by these companies in their operations under WPB's copper and copper alloy salvage programs. Permits Copper Recovery Corp. to offer this material to brass and bronze ingot makers at same price it could obtain from the brass mills.

**No. 43** (Amendment): **Used Steel Drums, Pails and Containers,** effective April 22. Removes qualification that emptied containers are priced as sold to a filler, extending operation of the schedule to cover purchases by any class of buyer.

**No. 64** (Amendment): **Domestic Cooking, Heating Stoves,** effective April 21. Provides for price relief if (a) the maximum price is below the manufacturer's total costs; and (b) the manufacturer's entire stove manufacturing operation is being conducted at a loss or if it is shown his operations at present prices will result in a loss within 30 days.

**No. 236** (Amendment): **Heating Boiler Conversion Parts,** effective April 23. Establishes specific maximum prices for recently developed rectangular conversion grates to be used in converting heating plants from oil to coal. Provides formula for pricing grate areas other than those listed specifically.

**Supplementary Price Order No. 42,** effective April 22. Exempts from price control all sales of commodities or services to the United States government or any friendly government under terms of a secret contract or subcontract.

**Supplementary Regulation No. 1** (Amendment): Effective April 22. Regroups exemptions of commodity transactions from the General Maximum Price Regulation.

# Revisions Designed To Simplify War Production Board Reports

SOME 15,000 manufacturers, working on the principal war contracts, are receiving a revised WPB questionnaire combining two previous questionnaires and designed to simplify reporting. This form combines the Plant Report of Operations (WPB-732) with the Quarterly Report on Shipments of Products and Inventories of Critical Materials (CMP-7). It eliminates necessity of an additional questionnaire on power consumption.

Revised form was mailed with a letter from Charles E. Wilson, WPB executive vice chairman, which read in part: "The data required . . . are of utmost importance for overall policy determinations affecting the conduct of the war production program and for remedying conditions which limit the full utilization of our plants for essential production.

"The information here requested is regarded as sufficiently important to our joint effort, and the simplification of the questions asked has sufficiently reduced the burden of reporting, to warrant our decision that compliance with this request be made mandatory."

Revised form is one of the principal instruments through which the WPB will keep in touch with industry's problems arising from the war effort, and with the operations of individual plants. Bureau of Census mails questionnaires and compiles data contained in the returns.

Information drawn from the returns is made available to a number of operating divisions within the WPB and to the procurement agencies such as the Army, Navy and Maritime Commission on a confidential basis.

The new form will be the only one which gives an overall picture to the Controlled Materials Plan Division of the success of CMP in regulating industry inventories. It will assist in moving excess inventories into channels where they can enter at once into production. It is also the only report to WPB which indicates the overall distribution of finished products by claimant agency and preference rating.

## New Set of Class B Product Symbols Established by WPB

Entirely new set of Class B Product Symbols has been assigned to items falling within the jurisdiction of the various Industry Divisions of the WPB.

New symbols replace the former S-3 designation which was used for B products during the second quarter. The new symbols will not be applicable until the third and subsequent quarters.

Purpose of applying the new symbols to B products is to provide WPB with a means of determining at mill levels, the uses to which controlled materials will be put.

Each symbol indicates a B product program. Following examples will demonstrate their use:

1. Storage batteries, airline hydraulic motor brakes, automotive assemblies, carburetors other than those for aircraft, automotive repair shops except machinery and equipment, spark plugs, except for aircraft, all fall within the program designated B-4. This program is within the jurisdiction of the Automotive Division.

2. Electric motors, dynamotors, motor-generator sets, mine locomotive motors, and others, fall within the G-6B product program, under the General Industrial Equipment Division.

3. Railway car accessories, trolley bus and motor bus accessories, railway and transit signal equipmeent and other related transportations are designated M-8, under the Transportation Equipment Division.

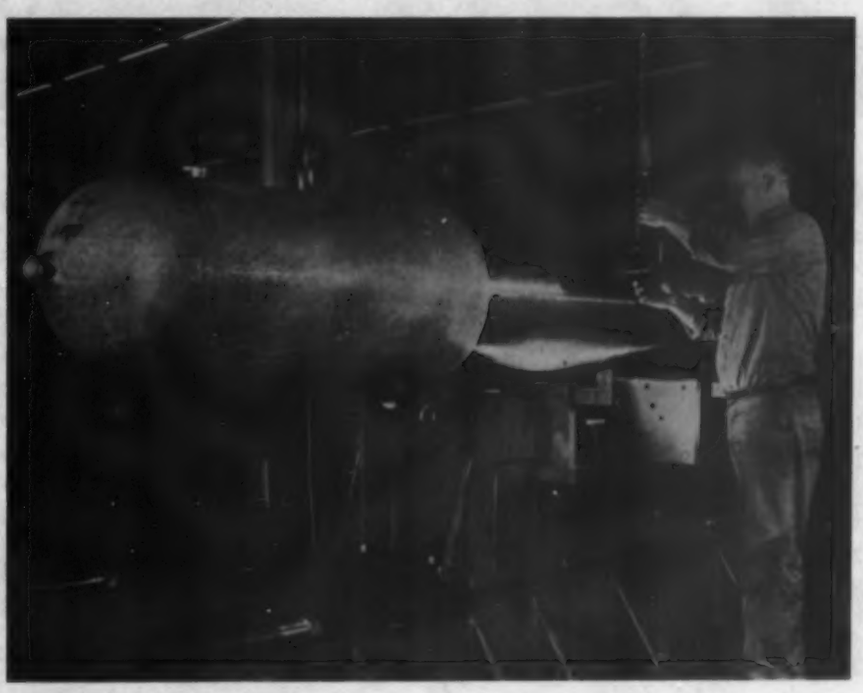
A special program, designated S-4, is established to cover a miscellaneous group of B products, including such items as loose-leaf binders, printing rolls, multigraph and printing presses, power coding machines, paper folding machines, wire stitching machines, and others. The plan for using the new B products symbol calls for continued use of S-1 symbol applying to repair parts.

This means that in applying a preference rating to industrial dust-collecting equipment, for example, the preference rating will be accompanied by the symbol J-5, which will give it an up-rating similar to that formerly granted by the use of the symbol S-3.

## New Steel Tubing Allotments

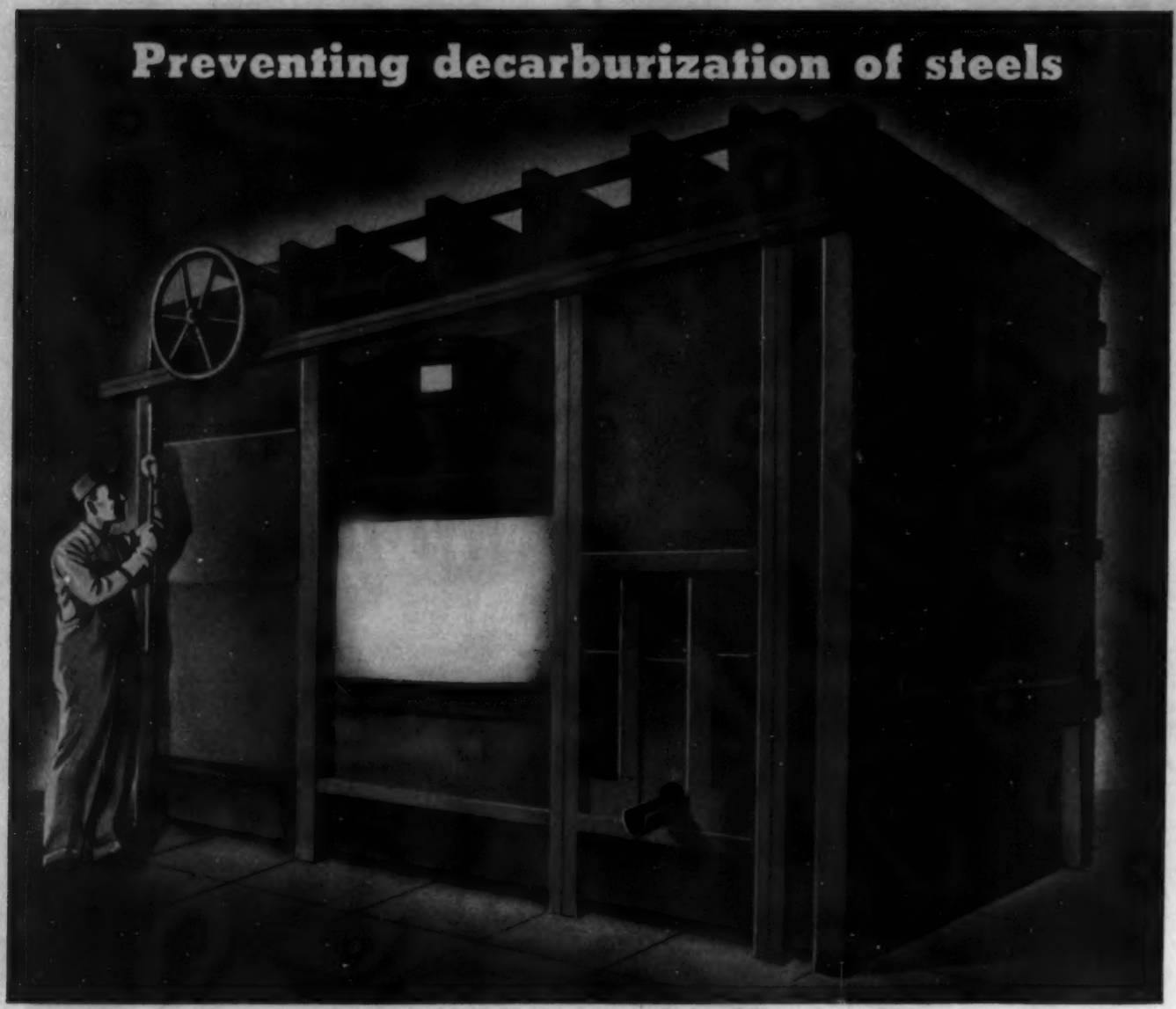
A new form, ASU-40, has been issued for allotments of steel tubing. This is a revision of SUWPB-18 and the usual procedure is followed in filling out ASU-40 in requesting steel tubing. Copies of ASU-40 may be obtained by writing o Aircraft Scheduling Unit, Steele High building, Dayton, O.

## WAR'S MOST COMPLEX WEAPON?



**PRODUCTION of aerial torpedoes is months ahead of schedule at General Motors' Pontiac Motor Division. Torpedoes come off the assembly line as shown in the illustration. Finished, they weigh nearly a ton, are composed of more than 5000 parts and 1000 different assemblies. Some parts are so small that hundreds may be held in a thimble, are lubricated with a hypodermic needle. Its builders consider it "the most complex weapon in the history of warfare"**

# Preventing decarburization of steels



*Information supplied by an Industrial Publication*

The principal factors that must be considered in any attempt to prevent the decarburization of steel are the steel analysis, temperature and time of heat treatment and the furnace atmosphere.

All of them are subject to modification, or control, as a means of prevention. But since changes in steel analysis, or in temperature and time of treatment are often impractical, the furnace atmosphere offers the best general point of attack.

If the furnaces in use are basically unsuitable, the best method of correcting the trouble is to replace them with controlled atmosphere furnaces carefully selected to meet individual requirements. If this cannot be done, an analysis of the furnace atmospheres should be made to determine whether or not carbon dioxide or water vapor are present. If they are, one remedy consists of installing auxiliary equipment to eliminate the $CO_2$, and to reduce the $H_2O$ to the lowest possible level.

There is another method that may work if light scale on treated parts is not objectionable. This consists in using a slightly oxidizing atmosphere (2-5%). Decarburization of certain high carbon and tool steels is virtually eliminated. The method is safe to try with steels that do not require temperatures over 1600° F.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE—BRIQUETTED OR CANNED • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

MOLY

Climax Molybdenum Company
500 Fifth Avenue • New York City

By A. H. ALLEN  Detroit Editor, STEEL

# MIRRORS of MOTORDOM

*This small car is not considered too radical except for the transparent forward roof and windshield combination. Entire concept suggests the lines of ultra-modern motorboats*

***Conventional steel frame destined to be replaced by tubular steel frame, combining body and chassis into single unit. . . Rear engines and banning of metal wheels appear as likely changes***

THIS analysis of the postwar automobile already has considered the case for competing materials in general, and for engine developments. Next on the list is automobile chassis.

Under the heading of chassis may be included such components of the automobile as frame, axles, wheels, brakes, steering gear, springs and suspension system, transmission and differential. These all have been hitherto principally of steel, except for gray iron and malleable cast iron in such things as brakes, transmission and differential housings, etc. What has been discussed previously with regard to alloy steels, carbon steels and the newer lean alloy steels applies equally well here. Already hundreds of thousands of assemblies such as rear axle gear sets have been produced from NE steels for army truck service and have proved workable, heat treatable and satisfactory in performance.

The conventional type of steel frame made up of channel or box sections tied together with cross members, diagonal bracing and kickups over front and rear axles, probably is destined to give way in favor of the tubular steel frame which combines body frame and chassis frame into a single unit. The latter type of construction already has seen limited application in the passenger car field and it makes the motor car more of a structural entity, as against the old and outmoded system of building a chassis and then bolting a body onto it.

The tubular section, whether round, square or rectangular, is one of the strongest, if not the strongest, steel section available, comparing pound for pound. Advances in welding technique have simplified production and cut costs of welded tubular assemblies. It should become the universal type of motor skeleton or frame eventually.

With the welded tubular steel, of possibly aluminum alloy, frame adopted as standard, the possibility arises of moving engines to the rear of the car. Rear engines, standard for several years in certain buses and trucks, have not met much favor among passenger car designers, principal difficulty being the matter of weight distribution. A 25 per cent reduction in engine weight might make more feasible the switch of the power plant to the rear, permitting increased room for the passenger compartment, better vision from the driver's position and numerous other advantages.

But the public is not yet educated to rear engines in their cars and it will take more daring than has been exhibited in the automobile industry in the last 15 years to make the change.

The influence of airplane design upon automotive wheel suspension systems may be appreciable. Of first importance is the possibility of adapting the airplane oleo or hydraulic shock absorber to automobile wheels. Experimentally this method has looked promising from the time W. B. Stout first tried it on his famous Stout Scarab car. But it never got anywhere commercially.

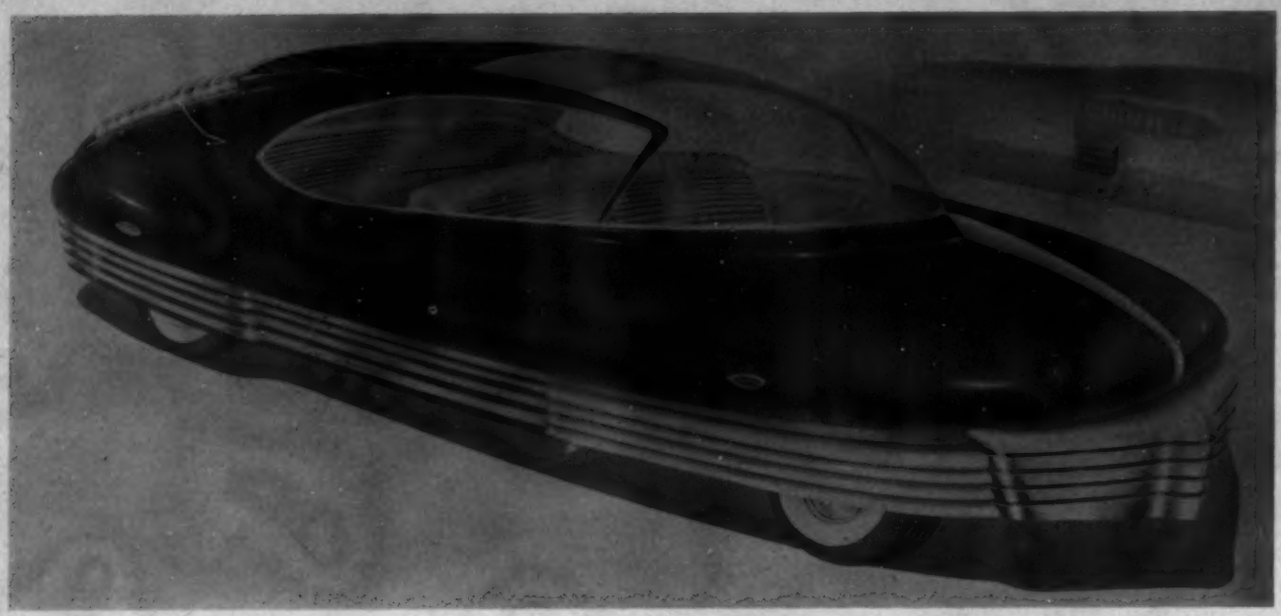
If certain units of the aviation industry make good their boasts to enter the postwar automotive market with new cars, then it is a pretty safe bet their designs will have such types of wheel suspensions. True they complicate the hook-up of power between the engine and driving wheels, but this can be engineered without the result looking too hopeless. Such a type of suspension permits a virtual "cradling" of the car body between the wheels, thereby lowering the center of gravity (and center of tipping) to a point where an exceptionally smooth ride is provided.

With regard to conventional types of suspension systems, coil springing seems fairly well established and promises to continue in use, although economies must certainly be in store for the type of steel used in these coils. Silicomanganese alloy likely will give way to the NE type steel, heat treated and shot-blasted (or possibly nitrided) to insure maximum fatigue life.

**A SPECIAL REPORT TO INDUSTRY**

**THE POSTWAR AUTOMOBILE**

**This is the third in a series analyzing the postwar automobile, with primary emphasis on passenger cars, from the standpoint of possible changes in materials, subassemblies and manufacturing technique.**



*This is an example of extending bumper treatment clear around the car as conceived by George W. Walker, Detroit designer. Roof construction is unusual, might prove difficult to manufacture*

The Torsilastic spring—a steel tube with a concentrically mounted steel bar and the space between them filled with rubber bonded to the steel—has interesting possibilities, but the gradual deterioration of rubber with time and under attacks of heat, cold and moisture, casts doubts on the future of this system. Volute-type springs, used widely on military tanks, are costly to produce and seem to have little possible future in the automotive field.

There is a possibility leaf springs may have a rebirth of acceptance if means can be found to make interleaf friction a constant and controllable factor. Actually, a well designed leaf spring unit, particularly one of the variable-rate types such as developed in recent years for rear springs in one popular type of car, can provide a much better ride in a car, especially from the standpoint of sidesway, pitching, etc., than can the softer coil springs.

### Hydraulic System Has Future

It will not be long before power—either hydraulic or vacuum—is incorporated in steering and braking systems of all types of passenger cars. Vacuum booster systems on brakes for trucks and buses have proved valuable aids to drivers, and their adoption on smaller automotive units is a natural step. Knowledge of hydraulic systems and their applications has been stepped up greatly by war production activity, and this should help to provide a low-cost, foolproof hydraulic or booster system which would relieve drivers from exerting manual and pedal energy.

Contributing to the lower cost of such devices to facilitate braking and steering are the many advances in the art of tooling and machine operations. There are literally thousands of contributions which have been made in these fields, many of them by the individual machine operators themselves. Most of the ideas are aimed at reducing the time required in machining a certain part, eliminating tedious hand operations, reducing scrap, etc., all of which add up to important cost savings.

Automobile wheels, like the human little toe, have gradually been shrinking to the point where the wheel becomes little more than a rim on which to mount a tire, with a flange to be bolted to axle studs. Perfection of the tubeless tire, made in recent months, presages some revisions in wheel design, so that a complete sealing of the tire casing can be effected. Going a step further, it may be possible to mold a pneumatic tire and flange entirely out of rubber—or synthetic rubber—carrying metal inserts to fit over mounting studs. This would mean the disappearance of metal wheels as they are now known.

On the score of transmissions, it takes no occult powers to forecast that the completely automatic transmission, with infinitely variable speed ratio between engine and rear axle, is definitely on the way. In fact, it is halfway here in the Chrysler fluid drive plus semiautomatic gearshift; and in the Oldsmobile-Cadillac Hydramatic drive with its fluid coupling and semiautomatic transmission.

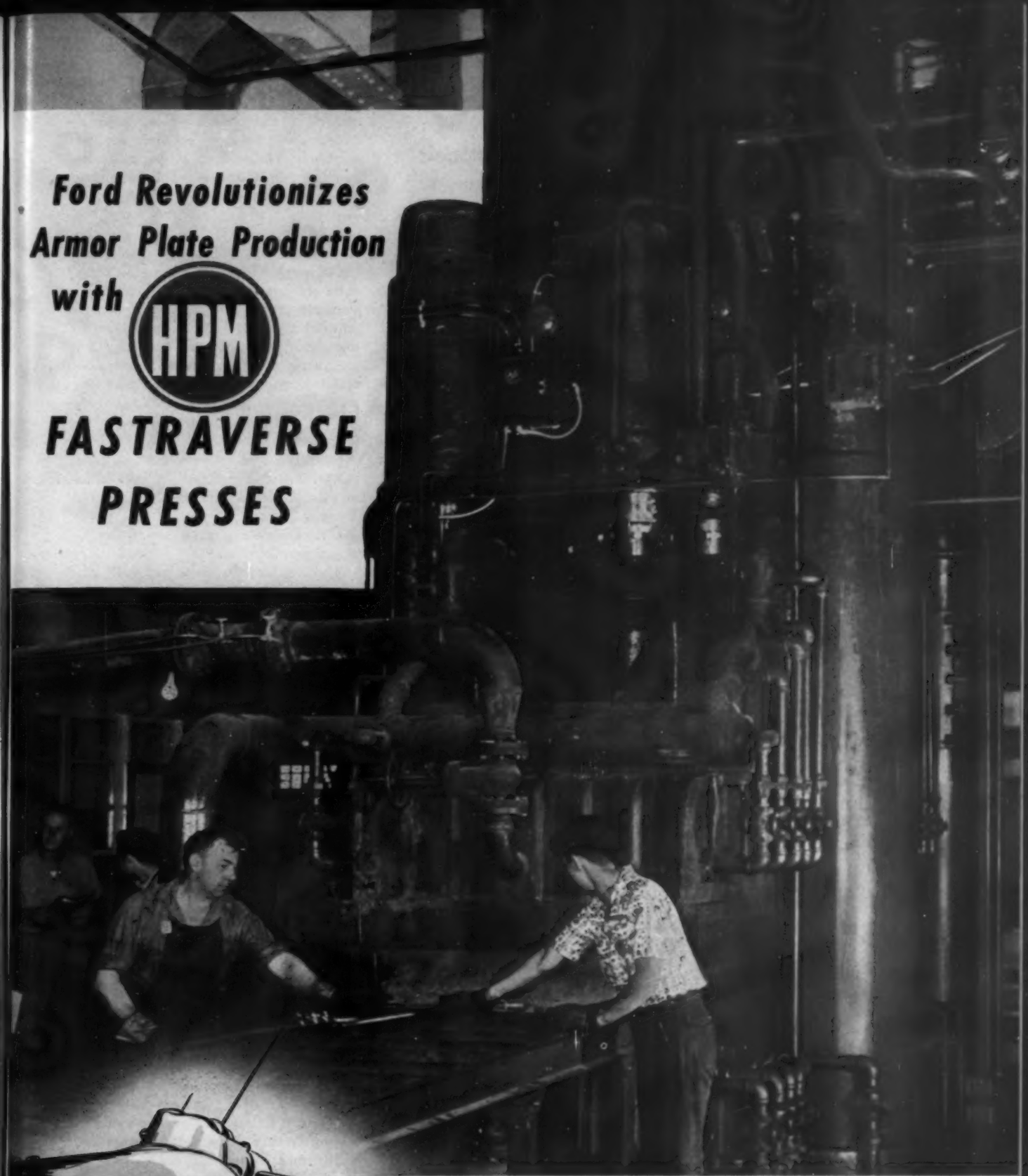
These two devices, now in service on large numbers of cars for several years, are by no means perfect. They cost about 10 per cent in gasoline economy, and they give trouble in cold weather. But they are important steps in the direction of eliminating altogether the human factor in transferring engine power to driving wheels. They indicate a recognition by the industry of the trend, and its willingness to spend large sums of money for tooling to produce the automatic transmission. One needs only to look at the acres of new machine tools of all types installed for various types of war production in the motor industry to envisage the possibility of retooling some of this equipment in the postwar era to produce fully automatic transmissions. The designs are ready; all that remains is to transfer them to economical production. Here again, however, the interval of proving ground testing is a "must" before these new transmissions can be offered.

### Interesting Type of Transmission

One of the most interesting types of transmissions to appear on the horizon in prewar years was the hydraulic turbine design, whereby the engine drives a large hydraulic pump which in turn supplies pressure to small turbines mounted on the four wheels. Test cars with the novel system installed have been operated and studied in detail, suggesting that the idea may have important practical implications.

What about the bodies for the passenger automobile of tomorrow? Will they be patterned after the fantastic sketches which have been featured in the public prints lately? Next week an analysis of some of the factors involved will be presented.

# Ford Revolutionizes Armor Plate Production with HPM FASTRAVERSE PRESSES



**Another industrial advance through the use of HPM Fastraverse Presses is expressed in the revolutionary steel quenching process developed at the Ford River Rouge plant in the production of heavy armor plate for M-4 Army tanks. In but a few minutes of the hours required by the conventional process, this 2500-ton HPM Press with water-cooled dies discharges finished annealed plate flat and straight. HPM Fastraverse Hydraulic Presses are performing equally outstanding tasks on every metal working front.**

**THE HYDRAULIC PRESS MFG. COMPANY ★ Mount Gilead, Ohio, U. S. A.**

District Sales Offices: New York, Syracuse, Detroit and Chicago • Representatives in Principal Cities

# WING TIPS

***Douglas Aircraft Co. expands from two to seven plants within two years. . . Production of 12 models aided by wise subcontracting. . . BVD plan of pooling facilities has contributed to greater output***

*LOS ANGELES*

AIRCRAFT companies, virtually without exception, have been faced with monumental tasks in fitting their formerly limited facilities to the demands of war, and perhaps nowhere is this job better exemplified than at Douglas Aircraft Co. Inc., which was asked to expand its facilities from two original plants in California to seven plants throughout the nation, to place in full production nearly a dozen different warplanes (not all of them Douglas designs), to plan and manage an overseas service and assembly project, and to expand its personnel at home nearly tenfold—all this in a little more than two years.

Briefly the solution was a matter of adding the technique of "show how" to the Douglas company's demonstrated "know how". This sounds relatively simple, but when it is remembered that supervisory personnel was limited in number to begin with, the difficulty of spreading this reservoir of "know how" over a wide area can be appreciated.

At any rate, five great new plants have been built and are now in operation, although the one at Chicago, a masterpiece of wood plant construction, is still some distance from what could be considered the production stage. Two original plants in southern California have been expanded in a major degree. The dozen different models are rolling out in record quantity and new models are approaching production.

A new army of Douglas workers has grown nearly tenfold and a comprehensive program of training is in full swing to replace men required by the armed services and to meet the needs of expanded facilities. The plants in California now employ women to an extent far beyond most of their neighbors, percentage running between 60 and 70, and scheduled to go higher.

### Parts Flow Smoothly

Douglas boasts with perhaps pardonable pride that last year it operated 50 per cent more plant than any other airplane company, employed more workers than any other, and delivered more airplanes by weight than any other group of workers in the industry.

Such signal achievements would not have been possible without the teamwork and unity of supply plants and even competing companies, for no airplane builder can keep up to schedule without a smooth flowing flood of parts, subassemblies and materials. Subcontracting enters the picture here in an important way.

Several types of subcontracts may be cited as typical, not of Douglas alone, but of nearly all aircraft companies. First, there are major subcontracts for principal elements of the airplane, such as supporting or directive surfaces. Due to the space and facilities necessary for such work, decision on these awards normally is made at Douglas by the vice president in charge of manufacturing in the early stages of negotiations for the prime contract.

Second are minor subcontracted items comprising subassemblies for installation in the major structural units built within Douglas plants. Typical of this group are steel engine mounts and hydraulic assemblies.

Third are detailed parts and small subassemblies often fabricated on the outside under what is termed outside manufacturing.

Finally there are subcontracts for nonairborne products such as tools, jigs and fixtures, the rendering of services and maintenance and construction.

Since July 1, 1942, Douglas has awarded subcontracts of all types involving approximately $275,000,000. These orders were spread among the facilities of some 300 principal subcontractors and at least 1500 lesser subcontractors. This utilization of resources is further extended to a degree that cannot even be calculated. For instance, consider a subcontract placed for a valve, involving 20 different parts, for which the single supplier in turn brought in seven additional subcontractors to participate in the program, and each of these may have called on the services of several more.

### Aided Small Town Firms

In many cases, Douglas has gone far afield to tap manpower reservoirs in small towns by assisting local firms to manufacture parts. In one instance of this sort, a California hardware merchant some distance from Los Angeles was induced to construct a small plant and send workers from his town to the Douglas plants at Los Angeles where they were trained in manufacture of certain types of wing sections. This plant is now in regular production.

Early in the game it was discovered that the "know how" of those in other industries, despite their skill and experience, was in most cases a separate and distinct philosophy that had to be bridged and co-ordinated with the characteristics of aircraft technique before produc-

## CARGO PLANE CAN CARRY 50 FULLY-EQUIPPED SOLDIERS

"FLIES just like a baby buggy" was the pilot's comment when he set this Douglas C-54, huge new cargo plane, down at Chicago enroute to a combat zone. The plane will carry 50 fully equipped and armed soldiers. NEA photo

# Immediate Conversion TO Speed Nuts

AIRCRAFT · KEEP 'EM FLYING

## . . . to meet your production schedules!

You can now convert to SPEED NUTS to help meet your production schedules ON TIME. SPEED NUTS are approved by the U. S. Army Air Forces and the Bureau of Aeronautics for non-structural attachments on military aircraft. They are also used on jeeps, trucks, tanks, P. T. Boats and other war equipment.

This provides a more abundant source of approved self-locking nuts to relieve the present shortage.

Our Engineering Dept. will be glad to assist you in determining the proper approved locations where Speed Nuts may be used. Request for information or assistance will receive immediate attention.

**TINNERMAN PRODUCTS, INC. • 2039 FULTON ROAD, CLEVELAND, OHIO**

**IN CANADA:** Wallace Barnes Co., Ltd., Hamilton, Ontario

**IN ENGLAND:** Simmonds Aerocessories, Ltd., London

Speed Nut System

THE FASTEST THING IN FASTENINGS

tion could begin. Accordingly, several or all of the following steps were taken to assist subcontractors in mobilizing their facilities (it should be remembered that this is the picture as seen by Douglas engineers and not necessarily by the "other industries" involved):

1. Contractors were invited to send key personnel to the Douglas plants where they were given access to all manufacturing facilities, provided with a groundwork in the methods and techniques for the particular work they were going to do.

2. A materiel office was established in Detroit with an organization of engineering, inspection and tooling experts. Under supervision of this office, representatives were placed at the plant of each major subcontractor in the district to assist them. Heading this Detroit organization, incidentally, was a well-known automotive sales and production executive.

3. Through this eastern (Detroit) office, subcontractors were schooled in the special characteristics of airplane manufacturing—precise weight control, careful handling of materials, avoidance of dents and scratches, necessity for accuracy in fixtures and assemblies and the need for conserving and salvaging vital tools and materials.

4. Subcontractors were shown how to adapt their tooling to the flexibility required by the regular improvement and modification demanded by service conditions.

5. Inspection methods essential to meet army and navy standards were taught to inspection staffs.

6. Techniques peculiar to the aircraft industry were taught—dimpling of sheet metal, forming of aluminum alloys, flush riveting and the welding of special types of alloy steel.

7. To assist subcontractors in training their personnel, Douglas educational experts drafted special courses, provided lantern slides, study materials and literature.

8. Groups of Douglas employes were loaned to subcontractors, and went to work in their plants during initial stages of contracts.

### Douglas Assists Competitors

Hand in hand with subcontracting to speed aircraft manufacture is the matter of pooling of facilities. Reference has been made previously in these pages to the B-V-D plan for pooling facilities of Boeing, Vega and Douglas to produce the Boeing B-17 Flying Fortress. Early in 1940, a somewhat similar arrangement provided for Douglas to license Boeing to produce for the British a large quantity of Douglas DB-7 attack bombers, now an obsolete model. To assist Boeing in this contract, Douglas furnished the following: Complete engineering data and drawings, facsimiles of all master planning cards, tool drawings for all major jigs and fixtures, loan of master jigs, production and tooling templates, machines and equipment for spar cap milling, patterns and dies in the hands of venders, materials in excess of $300,000 sold direct to Boeing, all hydropress parts fabricated from Boeing materials on Douglas presses, etc.

### Report Presented To Visitors

Here, then, is the gist of a report which Douglas presented recently to eastern aircraft executives who were visiting the West Coast in connection with announcement of consolidation of eastern and western Aircraft War Production Councils into the new National Aircraft War Production Council. Other companies contributed briefs on different subjects; for example, at Lockheed-Vega the subjects were recruitment of employes and hiring of women; at Northrop new engineering and manufacturing techniques; at Vultee absenteeism; at North American substitutions to relieve shortages; at Consolidated cutting man-hours through manufacturing methods and controls; and at Ryan quality control through shop teamwork.

NOT Buck Rogers entering his space ship but a test engineer about to step into the new cold room at Republic Aviation Corp., Farmingdale, N. Y., where the temperature can be dropped to as low as 92 degrees below zero to observe functioning of parts, controls, lubricants, etc., of P-47 fighter plane at stratosphere temperatures. Striking feature of the protective clothing being worn by the engineer is the transparent fishbowl helmet of plastic material. It has a double wall, inner and outer, with dead air space between for insulation and to prevent fogging. Fresh air for breathing is pumped into the fishbowl while the engineer is at work

## $30,000,000 Army Air Depot Completed at Oklahoma City

Model for the 11 established "air depots" or repair centers for the Army Air Forces is the recently completed $30,000,000 Midwest Air Depot at Oklahoma City, Okla., adjoining the Douglas plant there and employing at the moment 12,000 civilian workers. Occupying a site of 2400 acres, this facility provides repair work and stores for airplanes returning from various war theaters. Principal buildings are four large hangars of the "three-hinged arch" type of steel construction (reportedly decided upon because of occasional 100-mile an hour winds encountered in this district), into which went some 45,000 tons of structural steel. Main framework for each hangar comprises nine large arches tied together at their base by steel rods under the concrete floor.

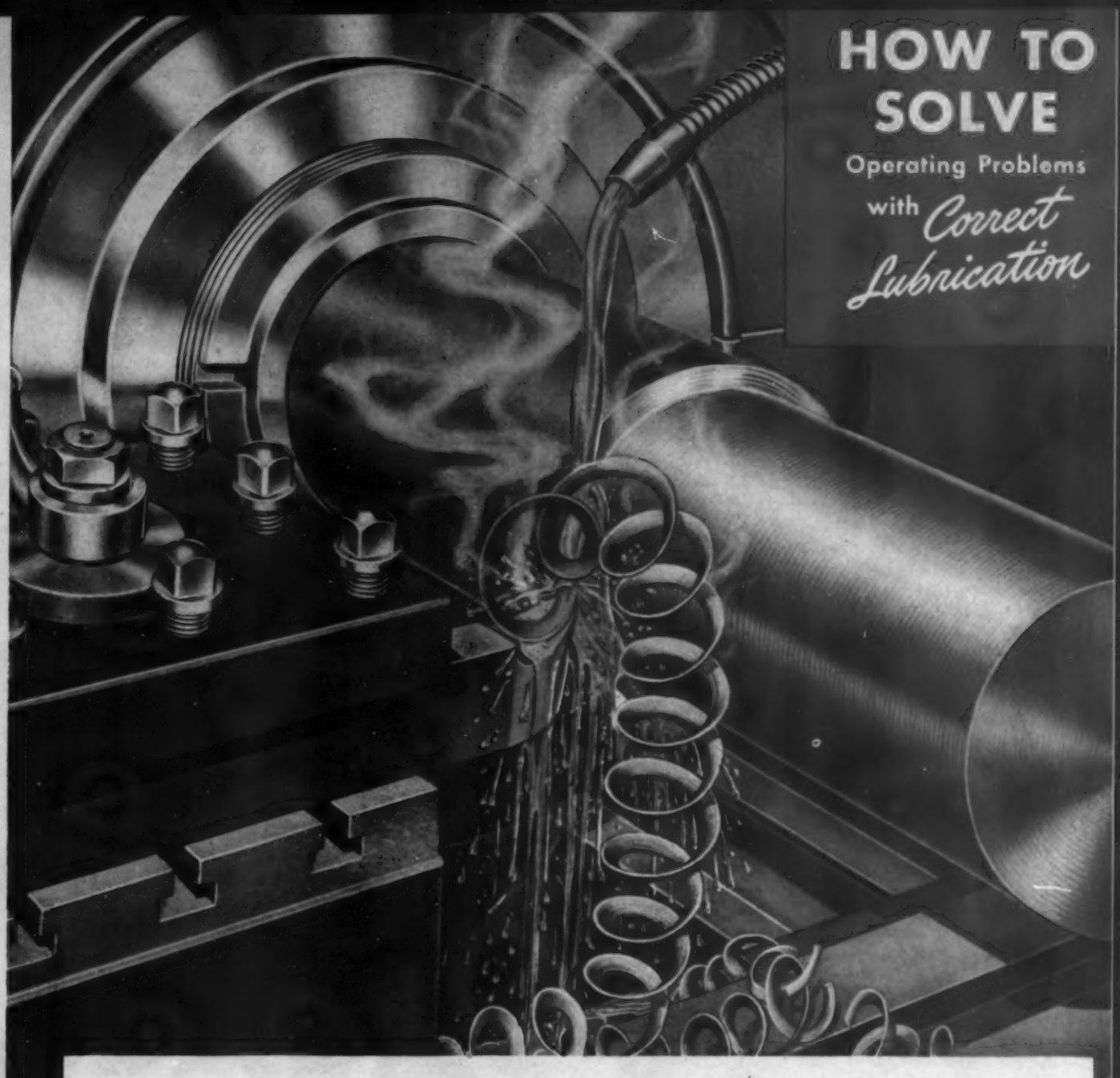
In addition to these repair hangars are engine repair facilities sufficient to handle complete overhauling of 3600 engines a year, including 12 test cells in which temperature can be from 100 degrees to minus 40 in a matter of 6 minutes; two 790 x 250 foot supply depots carrying some 154,000 air corps supply items in stock; barracks for service men, firing ranges, etc.

Located at Tinker Field, some 15 miles from Oklahoma City, this important branch of the Air Service Command, together with the vast new Douglas plant adjoining it, where C-47 cargo ships are now in production (Wing Tips, April 5, p. 86) constitute a veritable mirage to anyone coming upon them suddenly as he travels through the forest of oil derricks and red Oklahoma gumbo mud which for years have stamped the identity of the district.

—o—

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION



# HOW TO SOLVE

Operating Problems with *Correct Lubrication*

# No Smoking!

**PROBLEM:** When the cutting oil begins to smoke there's trouble afoot! It means that the friction between the chip and tool lip or between the work and the tool nose is producing more heat than the cutting oil can carry away. When tool temperature goes up, resistance to wear goes down. The rate of tool wear increases. Work finish suffers. Work size is not maintained, and rejects pile up!

**ANSWER:** First, make sure there is an adequate flow of oil. If the smoking continues, just cutting the oil back with a lighter-bodied mineral oil is not always the remedy, because this will decrease pressure-resisting, anti-welding and lubricity properties. *Friction increases!* What is needed is a correct balance of *all* properties. Our man will be able to recommend a S/V Sultran Cutting Oil that meets all requirements for your toughest job.

GARGOYLE Lubricants

SOCONY-VACUUM OIL COMPANY, INC. — Standard Oil of N. Y. Div. • White Star Div. • Lubrite Div. • Chicago Div. White Eagle Div. • Wadhams Div. • Southeastern Div. (Baltimore) • Magnolia Petroleum Co. • General Petroleum Corp.

CALL IN SOCONY-VACUUM

# Economist Urges Immediate Action To Avert Unemployment Problem

RECENTLY the Committee on Economic Policy of the Chamber of Commerce of the United States issued three important bulletins. They are the products of the committee's economist and secretary, Dr. Emerson P. Schmidt of the University of Minnesota. He was a member of the Minnesota Utility Franchise Commission and, among other things, was economic adviser to the government of Alberta, Canada, on provincial-dominion relations.

These bulletins deal with the subject of "Postwar Readjustments" and are entitled "Why Plan for a Postwar Period?", "The Favorable Factors" and "The Unfavorable Factors". An attempt will be made here to describe the nature of Dr. Schmidt's approach on the subject of postwar planning. It is suggested that interested readers obtain copies of the bulletins by writing to the chamber at 1615 H street, N.W., Washington, D. C.

Recalling that we emerged from World War I without a plan for the postwar period it is essential that, to the extent that manpower can be spared from the task of winning the war, it should be devoted to planning for our future, Dr. Schmidt declares. When he recalls dislocations of the past quarter century, and when he thinks about the difficulties that will come at this war's end in reconverting some 60 per cent of our resources back to civilian production, and when some 29,700,000 men and women will have to be reabsorbed in jobs that will have to be created, he also recalls the difficulty we had in the 30's in providing employment. It was not, he points out, until we went into our defense and, later on, our war production programs that we solved the problem of unemployment.

### Planning Is Serious Responsibility

Therefore, he concludes, we must devote enough brain power to thorough planning of the future if we are to avert chaos and anarchy. He points out that such studies are being conducted now on a wide scale; that any trade association, any corporation, or any institution concerned with the affairs of the country, that does not seek to help with this planning task, is failing to live up to its responsibility.

In discussing the future of the private enterprise system which is so universally popular in the United States, Dr. Schmidt is quite realistic.

"Under the modern industrial system, about four out of five people have no means of livelihood", he says, "except through sale of their labor. If they make no sale they do not eat—except by sufferance. Therefore, jobs and job continuity must be provided by the enterprise system if this system is to survive.

"Furthermore, the demand for economic security is enormous. Having 10,000,000 men unemployed is so wasteful of resources and so destructive of human values that ways and means must be found to sustain output and employment. Already people are saying: If the government can spend billions of dollars for purposes of defense and war and thereby bring prosperity, the same can be done to create jobs and prosperity in peacetime.

DR. EMERSON P. SCHMIDT

"This is a viewpoint which must be recognized, and conditions essential to meet the challenge must be discovered and put into effect. In short, we must be interested in ways and means. Anyone can state the problem—but this is not enough!"

Dr. Schmidt discusses the threat to our American way of life inherent in the problem of establishing an economic program that will work in the postwar period. While Americans favor the free system of enterprise, they are not necessarily wedded to that system. He recalls that the usefulness of the free enterprise system for the first time was questioned in the 30's when it failed to perform its old function of providing employment. If Americans become convinced in the postwar period that private enterprise cannot perform the obligation of furnishing employment they will look to the government.

If that happens, Dr. Schmidt looks for considerable suppression of freedoms that hitherto have been taken as a matter of course. If the government is forced to take the responsibility of providing work it will have to have power and authority to command, to dictate and to implement a policy with certainty and continuity once it is adopted. He points out that authority must go with responsibility. The Italians in 1922 when Mussolini took over and the Germans in 1933 when Hitler took over did not know what was in store for them.

If we are to maintain our free enterprise system, he declares, we must provide an "economic climate" favorable to expanded employment. Preservation of the American way of life is an issue which we cannot afford to postpone until it reaches a crisis. If we do it probably will be too late. Dr. Schmidt sees a peril in waiting too long before formulating a positive postwar economic plan; this is our democratic weakness in not acting until a crisis overtakes us. That is what makes it so important to take action now, with all the force we can muster, in order to get a postwar plan formulated and adopted before the postwar period arrives.

The above is a brief digest of what Dr. Schmidt has to say in his first bulletin entitled "Why Plan for the Postwar Period?"

### Postwar Balance Sheet

In his other two bulletins Dr. Schmidt presents a "Balance Sheet of Postwar Conditions." This is reproduced herewith:

**ASSETS**

1. Reduction of Private Debt
   a. Farm
   b. Mortgage
   c. Instalment sales
   d. Insurance loans
   e. Open book accounts
2. Reduction of State and Local Debt
3. Accumulated Private Purchasing Power
   a. Savings banks
   b. Insurance policies
   c. Government bonds
   d. Home ownership
4. Requirements for Foreign Rehabilitation*
   a. Food and clothing
   b. Animal feeds
   c. Breeding stock
   d. Machinery and equipment
5. Unemployment Compensation Benefit Rights
6. Deferred Demand*
   a. Decrease in inventories—retail, wholesale, manufacturer and consumer
   b. Consumer and semi-durables—example: clothing
   c. Consumer durables—example: housing and motor cars
   d. Deferred maintenance of consumer and producer properties
   e. Family formation
7. Technical Shifts Requiring New Capital; example—development of plastics and light metals*
8. Prospect of Avoiding Extreme Inflation
9. Growing Public Awareness of the "Role" of Business and Industry in the Economy
10. Trained Labor Supply and Know-How
11. Deferred Public Works

**LIABILITIES**

1. Delay of Reconversion to Civilian Production

a. Disposition of Government contracts and supplies
b. Conversion a time-consuming process
c. Scarcity of raw materials
d. Equipment
e. Wait-and-see attitude due to new materials

2. Taxes and National Debt
   a. Effect on working capital of business
   b. Costly task of reconversion
   c. Taxes and cost-price relationship
3. International Trade Uncertainties
4. Problem of Sustaining Investment in a High-Income Economy
5. Absorption of Total Labor Supply into Production
   a. Expanded labor supply*
   b. Expectations raised by wartime wages
   c. Plant and industry-wide collective bargaining assumes no responsibility for absorption of total labor supply
   d. Effect of high wages on mechanization*
   e. Payroll taxes on employer a tax on demand for labor
   f. Annual increase in labor supply about 700,000 workers
   g. Necessary investment per job
   h. Cost-price relationship
6. Maladjustments in Price Structure
   a. Wages
   b. Farm prices
   c. Other raw material prices
7. Government by Blocs and Pressure Groups
8. Lack of Unity as to Future Political and Economic Structure (Uncertainty)

* Some "assets" are in fact liabilities in terms of potential production (says Dr. Schmidt); likewise, some "liabilities" are advantages. Here, however, we are concerned with solving a specific problem—re-employment and getting civilian production under way after the war.

### "Stimulate Favorable Factors"

In his bulletin entitled "Is Postwar Collapse Inevitable?" he examines the assets. In his bulletin "The Unfavorable Factors" he examines some of the liabilities. The favorable factors, he urges, should be stimulated, guided and encouraged; the unfavorable ones should be stopped, redirected, or at least reduced to manageable control.

If people generally expect a postwar depression we are likely to have one, says Dr. Schmidt. If, on the other hand, people expect prosperity and *act* accordingly, current money incomes and funds from past savings will be put to work thereby creating prosperity.

But he points out that just "thinking prosperity" is not the way to avoid a postwar depression. He again emphasizes that "whether we consciously plan or not for the postwar period, the events, the course of financial, fiscal, and other economic developments *now* taking place will determine whether the sequences of economic events in the postwar period will make for boom or bust".

He is optimistic about future buying power; he cites the current rapid accumulation of buying power in one form or another and mentions family formation and pent-up demands that guarantee a big market for goods of many different sorts. He believes the gap in changing over from a war to a peace production program can be bridged without too much dislocation.

On the other hand he foresees grave dangers if we fail to keep the inflationary trend under control. Unless the national income can be kept at a high level he sees a menace in the mounting national debt. He speaks not only of the size of the tax load but also the effect of present tax laws upon business.

Thousands of small and large plants, he points out, are completely converted to war. Many other plants have had to close down either because of the loss of markets or the inability to obtain raw materials. Meantime, debt charges, insurance, and property taxes continue, gradually depleting the working capital of these companies; depreciation of plant and equipment is going on.

"Whether these concerns will be in a sufficiently liquid position in the postwar period to hire men, buy materials and equipment, and overhaul their plants, is problematical; many certainly will not," he declares.

For a decade, he points out, nearly all savings have sought the "security" of government bonds. Unless this fear psychology is reversed, he contends, we must expect more and more "governmental investment" as opposed to private enterprise. We are not going to have a permanently high level of employment after the war unless there is a high birthrate in new business ventures.

"Unless we alter the tax structure to enable new, youthful, venturing business organizations to retain a larger proportion of such profits as they may occasionally earn we cannot expect the ventures to be undertaken."

Dr. Schmidt makes some interesting observations on factors that will affect our future position in international trade. While several of the leading countries, including Great Britain and Germany, have done a reasonably good job in avoiding extreme inflation, currencies of many countries are badly upset so establishment of stable exchange values may take considerable time. This condition will affect various industries differently. Because our trade always has been largest with those countries which are the most prosperous and most advanced industrially it will be to our interest to help stimulate postwar development of less advanced nations.

### Warns of Productivity Limits

While the United States is making substantial promises with regard to world rehabilitation, Dr. Schmidt warns that our own productivity has limits, and some consideration must be given to conservation of our basic resources in terms of long-term requirements. In particular we should consider foreign trade as a two-way affair; over a period of time we should receive imports that are equal to the value of our exports.

## CANADA'S GUNS HEARD 'ROUND THE WORLD

FINISHING touches being put on huge quadruple mounts for belt-fed water-cooled Canadian two-pounder pompoms. The Dominion's naval ordnance program includes four types of guns and twelve types of mountings, although before the war munitions manufacture was negligible. NEA photo

# MEN of INDUSTRY

JOHN A. STEPHENS

FRANK J. COUGHLIN

A. S. RAIRDEN

T. M. CUMMINGS

**John A. Stephens** has been made vice president, industrial relations, United States Steel Corp. of Delaware, Pittsburgh. Mr. Stephens since 1938 has been director of industrial relations and in February, 1942, was elected a member of the board of directors and executive committee. He went to Pittsburgh from Chicago in 1938, from his former position as manager of industrial relations, Chicago district, Carnegie-Illinois Steel Corp.

—o—

**Frank J. Coughlin** has been appointed purchasing agent, Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn. Identified with the company almost 30 years, he has been assistant purchasing agent since 1928. He succeeds **Howard H. Wallace,** who has resigned because of ill health.

—o—

**John A. Elmes,** formerly chief engineer, Keystone Driller Co., Beaver Falls, Pa., has been named plant manager, Jones Engineering Co., Ellwood City, Pa.

—o—

**Joseph P. Kittredge,** for many years manager, Steel Castings Plant, National Malleable & Steel Castings Co., Sharon, Pa., has been given leave of absence to take a position as consultant on the staff of H. A. Brassert & Co., New York. He will be engaged in furthering the Brassert company's sponge iron development.

—o—

**Ted Nagle** has been made sales promotion and advertising manager, Sav-Way Industries, Machine Tool Division, Detroit. He formerly was associated with General Motors Corp. and Bendix Aviation Corp.

—o—

**William F. Wise,** executive vice president, Aviation Corp., Detroit, and president of the American Propeller Corp., Toledo, O., has been elected a director of National Tool Co., Cleveland. **Edward G. Hardig,** heretofore representative for National Tool at Detroit, has been made sales manager.

—o—

**Albert S. Rairden** has been made sales manager, Riehle Testing Machine Division, American Machine & Metals Inc., East Moline, Ill. Identified with the steel industry 20 years, and a well-known authority on wire rope, Mr. Rairden the past ten years has been associated with Wickwire Spencer Steel Co., in charge of sales engineering and sales of wire rope.

—o—

**Harry C. Wanner,** for 20 years president, Wanner Malleable Castings Co., Hammond, Ind., and recently head, Steel and Iron Casting Division, Chicago office, Office of Price Administration, has become president and taken over active management of Headford Bros. & Hitchins Foundry Co., Waterloo, Iowa. **O. E. J. Abrahamson** has been appointed vice president and superintendent. Mr. Abrahamson has served as an official of the American Radiator Co. in Buffalo and Detroit, and has spent the past seven years in Sweden as head of a large foundry there.

FRANK S. O'NEIL

*Who has been elected vice president of Indianapolis operations of Link-Belt Co., as announced in STEEL, April 12, p. 90*

—o—

**T. M. Cummings** has been promoted to executive vice president and general manager, Progressive Welder Co., Detroit. A vice president of Progressive since the company was organized in 1933, he obtained his early experience in resistance welding in the automotive industry.

—o—

**James C. McCurdy** has been elected president, McCurdy Furnace & Foundry Co., Canton, O., to succeed the late Herbert C. McCurdy.

—o—

**C. W. Higbee** has been made manager of the newly organized wire and cable department, United States Rubber Co., Cleveland.

—o—

Due to the dropping of a line of type an item in this department in STEEL, April 19, was confusing, and it is herewith repeated as originally written:

**A. L. Patrick** has retired as president, Cleveland Automatic Machine Co., Cleveland, to become chairman of the board. **Col. James Hammond Jr.,** formerly chairman and treasurer, has been elected president and treasurer, and **G. V. Patrick,** vice president, has been named executive vice president.

Colonel Hammond became associated with the Cleveland Automatic Machine Co. as a large stockholder, director and treasurer in 1941. G. V. Patrick joined the company 15 years ago as eastern sales manager, with offices in New York.

—o—

**Douglas H. Loukota,** sales manager,

has been promoted to director of sales and new development, Cannon Electric, Los Angeles. Succeeding Mr. Loukota as sales manager is **William V. Brainard,** formerly Cannon representative in northern California district.

—o—

**Charles E. Stutenroth** has been appointed assistant manager, Fabricating Division, American Rolling Mill Co., Middletown, O., succeeding **R. S. Gruver,** who has become manager of Armco's Ashland, Ky., Division.

—o—

**William H. Worrilow,** president, Lebanon Steel Foundry, Lebanon, Pa., has been elected a director, Armstrong Cork Co., Lancaster, Pa.

—o—

**Thad Smith Jr.,** associated with the brass and copper business the past seven years, has been named Houston district manager of Bridgeport Brass Co., Houston, Tex.

—o—

**R. S. Elberty Jr.,** a development engineer, specializing on design and styling of machinery and electrical drives for automotive operation, has engaged in business as a consulting engineer, with headquarters at 120 East Broward boulevard, Fort Lauderdale, Fla.

—o—

**Frederick W. Bierwirth,** vice president and telephone sales manager, Western Electric Co., New York, has been elected a member of the board of directors. All other directors and officers have been re-elected.

—o—

**Alden Horton,** the past 20 years purchasing agent for Hardinge Co. and its subsidiary, Steacy-Schmidt Mfg. Co., York, Pa., has resigned to become purchasing and procurement officer of Schick Inc., Stamford, Conn. He has been a member of the Purchasing Agents' Association of the Philadelphia district and served that organization as a director. He also served two terms as a director, National Association of Purchasing Agents.

—o—

**W. H. Dodge,** former supervisor, rate bureau, has become general supervisor, traffic department, western district, United States Steel Corp. subsidiaries. He has been with corporation subsidiaries since 1907. **H. W. Huebner,** assistant supervisor, rate bureau, succeeds Mr. Dodge as supervisor. **G. W. Annen,** rate analyst since 1932, has become assistant supervisor of rate bureau, succeeding Mr. Huebner, while **R. B. Zeller** has been appointed assistant supervisor of transportation.

—o—

**H. E. Engelbaugh,** since June, 1941,

C. E. STUTENROTH

R. S. ELBERTY JR.

ALDEN HORTON

superintendent of tube mills, Youngstown district, Youngstown Sheet & Tube Co., has been appointed assistant general superintendent, Campbell Works.

Other appointments are, **W. H. Yeckley,** assistant superintendent, Brier Hill plant; **T. A. Cleary,** superintendent, open-hearth department, Brier Hill plant; **M. S. Gettig,** superintendent, seamless tube mills, Campbell plant; **C. R. Coburn,** assistant superintendent, finishing division, seamless tube mills; **T. A. Mullaly,** superintendent, butt-weld and lap-weld mills, Campbell plant; **J. B. Brunot Jr.,** assistant superintendent, butt-weld and lap-weld mills; **G. B. Curl** and **B. J. Hogan,** assistant supervisors, industrial relations department.

—o—

**C. E. Bales,** vice president, Ironton Fire Brick Co., Ironton, O., was elected president, American Ceramic Society at its forty-fifth annual meeting in Pittsburgh, April 19. Mr. Bales served as president of the Ohio Ceramic Industries Association the past two years.

—o—

**Dr. Walter Savage Landis,** vice president, American Cyanamid Co., has been awarded the gold medal of the American Institute of Chemists. The medal will be presented to Dr. Landis at the annual meeting of the institute in May in recognition of his contributions to chemical engineering and development work, largely in the field of nitrogen derivatives, and for his services to the professional side of chemistry.

—o—

**C. Hart Miller** and **Alfred Marchev** have been elected directors, Republic Aviation Corp., Farmingdale, N. Y. Mr. Miller has been with Republic and its predecessor since 1935, being elected a vice president in June, 1942. Mr. Marchev is a vice president and also general manager.

—o—

**Dr. Robert V. Yohe,** technical superintendent, Chemical Division, B. F. Goodrich Co., Akron, O., has been made plant manager of the government synthetic rubber plant operated by the Goodrich company in Kentucky. He succeeds **J. W. Frasche,** who has become plant manager at another government synthetic plant in Texas which will also be operated by B. F. Goodrich.

—o—

**Frederick A. Westphal,** works manager, Sheffield Steel Corp., Houston, Tex., has been granted a leave of absence and has been commissioned a lieutenant commander in the United States Naval Reserve. He can be reached care of the Inspector of Naval Material, U.S.N., Niels Esperson building, Houston. Lieut. Commander Westphal is a past president of the Wire Association.

—o—

**James S. Rutherford** has been appointed chief financial analyst, price adjustment section, Chicago Ordnance District. He is on leave of absence from the brokerage firm of Norris & Kenly, Chicago, to assist in renegotiation of contracts for ordnance materiel.

—o—

**Dr. Robert M. Burns,** assistant chemical director, Bell Telephone Laborator-

DR. ROBERT M. BURNS

ies, was elected president of the Electrochemical Society at the eighty-third meeting in Hotel Roosevelt, Pittsburgh, April 8-10.

Three new vice presidents were elected: **K. G. Soderberg, H. H. Uhling,** and **H. E. Haring. W. W. Winship,** was re-elected treasurer and **Coling G. Fink,** Columbia University, New York, was re-elected secretary.

—o—

**G. E. Gustafson,** chief engineer since 1933 and assistant vice president since 1940, Zenith Radio Corp., Chicago, has been elected vice president in charge

CLAUDE J. NEVILLE

*Who has been elected vice president and treasurer, C. O. Bartlett & Snow Co., Cleveland, as announced in STEEL, April 19, p. 85. Heretofore vice president and works manager, Mr. Neville has been associated with the company since 1906*

of engineering. **R. D. Burnet,** controller and assistant treasurer, has also been elected secretary, while **Karl E. Hassel,** one of the founders of the company and a director since 1932, and **J. E. Brown** have become assistant vice presidents.

—o—

**Lloyd Arnold** has been named assistant to vice president, finance, American Steel & Wire Co., Cleveland. **Ralph Raymond** has been appointed supervisor of organization planning, succeeding Mr. Arnold. Associated with the company since 1900, Mr. Arnold held various positions in Cleveland before being transferred to Pittsburgh in 1918, where he was subsequently employed at the Farrell and Rankin Works. Since 1938, he has served as supervisor of organization planning. Mr. Raymond since 1942 has been staff assistant, organization planning division, United States Steel Corp. of Delaware, Pittsburgh.

—o—

**Louis F. Sattele** has been appointed assistant general superintendent, Lorain, O., Works, National Tube Co. **Earl C. Tatum,** now assistant general superintendent, will remain in his present position. Associated with the company 21 years, Mr. Sattele formerly was assistant general superintendent, Ellwood City, Pa., Works.

—o—

**Charles D. Wettach** and **John R. McCune Jr.,** Pittsburgh industrialists, have been elected to the board of directors, Sterling Varnish Co., Haysville, Pa. Mr. Wettach is past president, National Paint, Oil and Varnish Association of the United States. Mr. McCune is president, Consolidated Lamp & Glass Co., Coraopolis, Pa., and a director, Lockhart Iron & Steel Co.

## OBITUARIES . . .

**William O. Renkin,** 68, industrial designer and engineer, associated 40 years with the steel industry, died in Lancaster, Pa., April 16. Mr. Renkin was resident manager in charge of organization and construction of the Tata Iron & Steel Co., Sakchi, Bengal, India, and later joined A. M. Byers Co., Pittsburgh. He was among the first to apply pulverized fuel to steel furnaces, and as manager of the industrial furnace department of Combustion Engineering Co., New York, he developed various methods for use in steel-heating furnaces.

—o—

**Edward G. Clemenson,** 60, assistant general sales manager, National Carbon Co. Inc., New York, died in that city, April 18. He had been associated with Union Carbide & Carbon Corp. and National Carbon, an affiliate, since 1905.

—o—

**Charles A. Schranz,** 68, manager, machinery department, R. D. Wood Co., Philadelphia, died at his home in Wynnewood, March 22. He joined the Wood company in 1905 as an engineer. He was also a director, Florence Pipe Foundry & Machine Co., Philadelphia, and a member, American Society of Mechanical Engineers.

—o—

**J. Ward Henry,** former superintendent, Electro-Alloys Co., Elyria, O., died March 9. He had been identified with the company more than 20 years.

—o—

**Robert E. Sherratt,** 53, assistant purchasing agent the last four years, Republic Steel Corp., Cleveland, died April 16 in that city.

—o—

**John Jensen,** 64, president and general manager, Whitney Metal Tool Co., Rockford, Ill., died April 16 in that city.

—o—

**Ernest T. Clary,** general superintendent, Whitin Machine Works, Worcester, Mass., died April 10, in that city.

—o—

**George E. Deming,** 55, vice president and secretary, Philco Corp., Philadelphia, died April 15, at his home near Bryn Athym, Pa. He joined Philco in 1914.

—o—

**Charles Dunham Deshler,** 79, inventor and associate of Thomas A. Edison, died April 14 at his home in New Brunswick, N. J. He received the Charles A. Coffin medal for scientific advancement for perfecting in 1893 a photo-electric cell. He became associated with Edison in 1887, and continued his work at the Harrison and West Orange laboratories until Dec. 31, 1930.

—o—

**Clarence E. Postlethwaite,** 77, retired assistant vice president, Pressed Steel Car Co., Pittsburgh, died at his home in New Rochelle, N. Y., April 15. He was employed in 1897 by the Schoen Pressed Steel Co., and when the company was merged with Pressed Steel Car in 1915 he became general sales manager. He was appointed assistant vice president in 1929 and a year later retired.

—o—

**James E. Cooper,** 70, vice president and counsel of the Stanley Works, New Britain, Conn., died at Orlando, Fla., April 10. From 1909 to 1921 he was corporation counsel for the city of New Britain.

—o—

**William Lee Powers,** 52, general manager, American Cyanamid & Chemical Co., died in Little Rock, Ark., April 18, where he directed the company's bauxite mining operations.

# Capital Expenditures in 1942 Second Highest Since 1930

CAPITAL expenditures for equipment and other improvements to railroad property made by Class I railroads in 1942 totaled $534,897,000, a decrease of $8,124,000 below those made in 1941, according to the Association of American Railroads. Except for the preceding year, capital expenditures were greater than in any year since 1930 when they amounted to $872,608,000.

(Detailed steel purchases were listed in STEEL, April 19, p. 59).

Of total capital expenditures made in 1942, $349,374,000 were for locomotives, freight-train cars, passenger-train cars and other equipment and $185,523,000 for roadway and structures. Capital expenditures in 1942 for equipment were $18,194,000 below those in 1941 but expenditures for roadway and structures, were $10,070,000 above the preceding year.

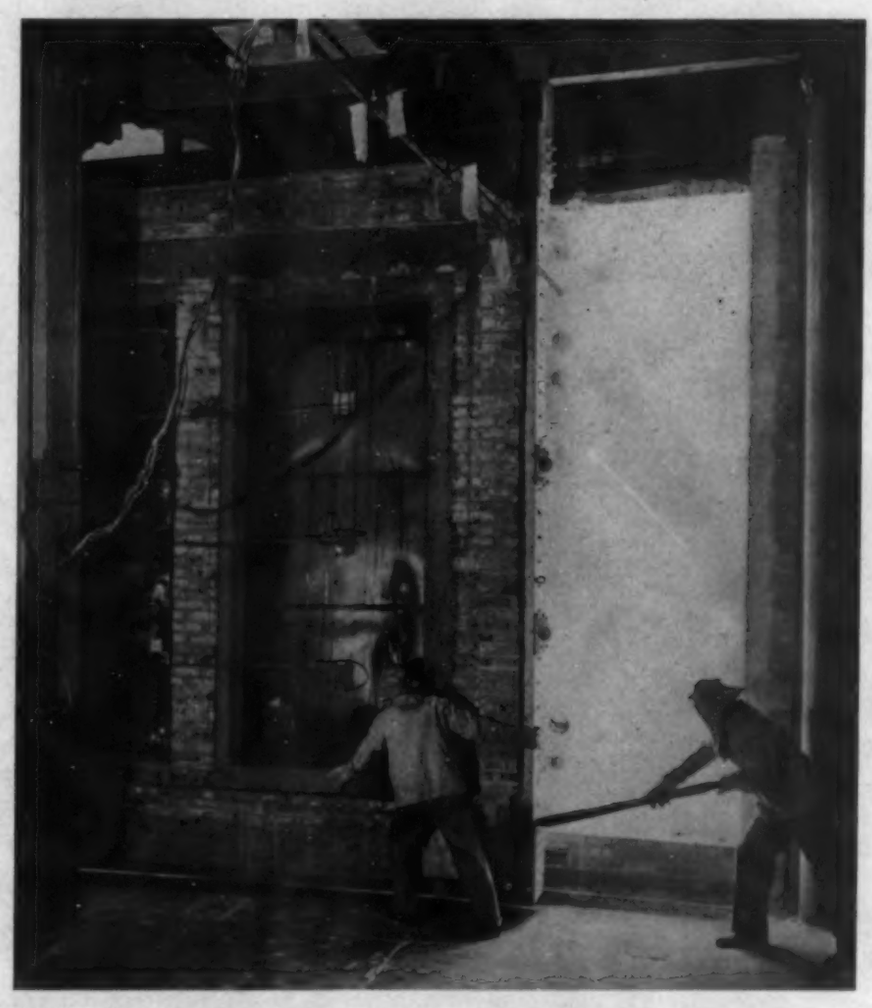
Expenditures for freight cars in 1942 totaled $201,112,000 compared with $245,713,000 in 1941. For locomotives, Class I railroads expended $113,834,000 in 1942, compared with $80,607,000 in 1941. Expenditures for passenger cars amounted to $24,075,000 in 1942 compared with $29,544,000 in the preceding year. For other equipment, the railroads in 1942 expended $10,353,000, a decrease of $1,351,000 below the amount spent for that purpose in 1941.

Of the $185,523,000 spent for roadway and structures, more than half was used for improvement of tracks and sidings. For additional track, capital expenditures in 1942 totaled $6,235,000 compared with $3,781,000 in the preceding year. For yards and sidings, expenditures in 1942 totaled $43,330,000 compared with $25,374,000 in the year before, and for heavier rail the railroads spent $33,100,000, or a decrease of approximately $3,000,000 under such expenditures in 1941. In addition, the railroads spent $5,487,000 for additional ballast and $21,471,000 for bridges, trestles and culverts. Expenditures for shops and engine houses in 1942 amounted to $13,623,000, or a decrease of $300,000 under the year before, and for station and office buildings and other station facilities $10,623,000, which was slightly less than spent for that purpose in 1942. For signals and interlockers including telephone and telegraph lines and automatic train control, they expended $16,261,000 in the past calendar year, or an increase of $2,822,000 above 1941, and for other improvements $35,393,000, which was a reduction of approximatelv $11,000,000 compared with the year before.

Capital expenditures made annuallv by the Class I railroads in the past 14 years follow:

| | | | |
|---|---|---|---|
| 1942 | $534,897,000 | 1935 | 188,302,000 |
| 1941 | 543,021,000 | 1934 | 212,712,000 |
| 1940 | 429,147,000 | 1933 | 103,947,000 |
| 1939 | 262,029,000 | 1932 | 167,194,000 |
| 1938 | 226,937,000 | 1931 | 361,912,000 |
| 1937 | 509,793,000 | 1930 | 872,608,000 |
| 1936 | 298,991,000 | 1929 | 853,721,000 |

## TESTING STEEL DOOR AT 1790 DEGREES FAHR.



WORKMEN wearing asbestos jackets and fire-protective helmets move this portable brick panel, in which soundproof steel door for airplane engine testing cell was mounted for a fire test at the Underwriters' Laboratories Inc., Chicago. The door was subjected to gas flames and heat of 1790 degrees Fahr. for 90 minutes. Then, red hot, it was moved away and a stream of cold water at 50 pounds pressure was played on it. If the door warped, latches broke, or combustible materials ignited, it was rejected

## Commemorate Two Centuries Of Iron-Steel Production

Taylor-Wharton Iron & Steel Co., High Bridge, N. J., has published a booklet commemorating its 200th anniversary as the country's oldest iron and steel producer.

The 57-page booklet contains a complete history of the company beginning with William Allen's lease of a tract of about 3000 acres in west New Jersey in 1742. Photos of the Union Forge, the ruins of which still stand on the company's property at High Bridge, and documents which attest the organization's early history are scattered in the publication.

An old mold, used to cast cannon balls for Washington's army during the Revolutionary War, is still in the company's possession.

*Commander A. S. Kibbee, Navy, addresses more than 4000 Johns-Manville Co. workers and their families who attended the Army-Navy "E" award ceremonies at the J. M. Manville, N. J., plant*

## Metalworking Companies Honored by Armed Services

Metalworking companies honored by the Army and Navy for outstanding production last week include:

Allegheny Ludlum Steel Corp., West Leechburg, Pa.
Alvey-Ferguson Co., Cincinnati.
American Electric Furnace Co., Boston, and plant No. 2, Dorchester, Mass.
Ampco Metals, Inc., Milwaukee.
Atlas Powder Co., Ravenna Ordnance Plant, Apco, O.
Autoyre Co., Oakville, Conn.
Boonton Radio Corp., Boonton, N. J.
Bronson Reel Co., Bronson, Mich.
Don Baxter, Inc., Glendale, Calif.
Century Engineering Corp., Cedar Rapids, Iowa.
Chicago Roller Skate Co., Ware Brothers Division, Chicago.
Cleveland Dental Mfg. Co., Cleveland.
Climax Engineering Co., Clinton, Iowa.
Consolidated Packaging Machinery Corp., Buffalo.
Curtiss-Wright Corp., Propeller Division, Caldwell-Clifton, N. J.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Defiance Machine Works, Defiance, O.
Dow Chemical Co., Bay City plant, Bay City, Mich.
Driver-Harris Co., Harrison, N. J.
Eaton Engravers Machinery Corp., Sag Harbor, Long Island, N. Y.
Firth Sterling Steel Co., McKeesport, Pa.
General Electric Co., Lynn River Works, Everett Supercharger Department, Everett, Mass.
General Motors Corp., Buick Motor Division, Flint, Mich., and Melrose Park Plant, Melrose Park, Ill.; Chevrolet Motor Division, Chevrolet Motor & Axle, Tonawanda, N. Y., Plant No. 1, Tonawanda, and Plant No. 2, Buffalo; Delco-Remy Division, Anderson, Ind.
General Motors Corp., Fisher Memphis Aircraft Division, Memphis, Tenn.
Gillette Machine & Tool Co., Hollywood, Calif.
Goodman Mfg. Co., Chicago.
B. F. Goodrich Co., Los Angeles.
Harley-Davidson Motor Co., Milwaukee.
Lindberg Steel Treating Co. Inc., Chicago.
Mahoning Valley Steel Co., Niles, O.
Malleable Iron Range Co., Beaver Dam, Wis.
McQuay Norris Mfg. Co., St. Louis Ordnance Plant. St. Louis.
National Pressure Cooker Co., Eau Claire, Wis.
Northwest Metal Products Inc., Kent, Wash.
Ohio Ferro-Alloys Corp., Philo, O.
Plomb Tool Co., Los Angeles.
Rau Fastener Co., Providence. R. I.
Republic Drill & Tool Co., Chicago.
Rohr Aircraft Corp., Chula Vista, Calif.
Standard Steel Spring Co., Plants 1, 2 and 3, Coraopolis, Pa.
Studebaker Corp., Aviation Division, Chicago, Fort Wayne, Ind., and South Bend, Ind.
Traylor Engineering & Mfg. Co., Allentown, Pa.

*Holding the Army-Navy "E" flag presented to the LaPlant-Choate Mfg. Co. Inc., Cedar Rapids, Iowa: Keith Churchill, employe representative; Capt. David C. Hanrahan, Navy; Brig. Gen. Stuart C. Godfrey, Army Air Force; Roy E. Choate, president, LaPlant-Choate Mfg. Inc.*

## Treasury To Nominate War Plants for "E" Awards

Arrangement whereby the Procurement Division of the Treasury will nominate war plants to receive the Army-Navy "E" award has been completed.

Clifton E. Mack, director of Procurement, said Army and Navy officials henceforth will consider awarding the emblem of production excellence to eligible contractors recommended by the Procurement Division.

The division will examine "the cream" of approximately 7000, large and small, whose production includes manufacture of the "non dramatic" articles of war, such as hand tools, agricultural implements, trucks, miscellaneous articles and metals supplied to foreign nations under the lend-lease program.

## Inland Steel Transforms Kentucky Mining Town

Inland Steel Co., Chicago, in 1930 bought the Wheelwright coal mine and the town of Wheelwright, W. Va., from the Elk Horn Coal Corp., to provide coking coal for its ovens at East Chicago, Ind. Since that time the new owner has improved the mine, installed modern mining equipment and has transformed the town from its former state to a modern, bustling small city with all modern improvements.

The company has issued a booklet written by Lewis Williams, entitled "The Transformation of a Coal Mining Town", which by text and pictures presents the contrast between the Kentucky hill town of little more than a decade ago and the present up-to-the-minute industrial city, with schools, clubhouse, swimming pool, church and modern homes.

## War Plant Expansions, Equipment Authorized by DPC

Additions to war plants and purchases of new equipment to be financed by Defense Plant Corp. and operated by the contractors were authorized last week as follows (figures approximate):

Utica Drop Forge & Tool Corp., Utica, N. Y., to provide additional plant facilities in New York at a cost of $310,000.

Scullin Steel Co., St. Louis, to provide additional facilities for a plant in Missouri at a cost of $360,000, resulting in an overall commitment of $11,350,000.

N. A. Woodworth Co., Ferndale, Mich., to provide additional plant facilities in Michigan at a cost of $86,000, resulting in an overall commitment of $4,135,000.

Curtiss-Wright Corp., Caldwell, N. J., to provide additional plant facilities in New Jersey, Pennsylvania and Indiana to cost $7,875,000.

Commodity Credit Corp., Washington, to provide plant facilities in Iowa and Illinois at an average cost of $350,000 each.

Boeing Aircraft Corp., Wichita, Kan., to provide additional facilities at a plant in Kansas at a cost of $1,000,000, resulting in an overall commitment of $27,000,000.

Rohr Aircraft Corp., Chula Vista, Calif., to provide additional facilities at a plant in California at a cost of $80,000, resulting in an overall commitment of $2,600,000.

Phelps Dodge Copper Products Corp., New York, to provide additional plant facilities in California at a cost of $185,000, resulting in an overall commitment of approximately $4,000,000.

National Industries Inc., Fort Wayne, Ind., to provide additional equipment for plant in Indiana to cost $85,000.

Hydraulic Equipment Co., Cleveland, to provide equipment for a plant in Ohio at a cost of $85,000.

Prest-O-Lite Co. Inc., New York, to provide equipment to be used in distribution of its products at a cost of approximately $800,000.

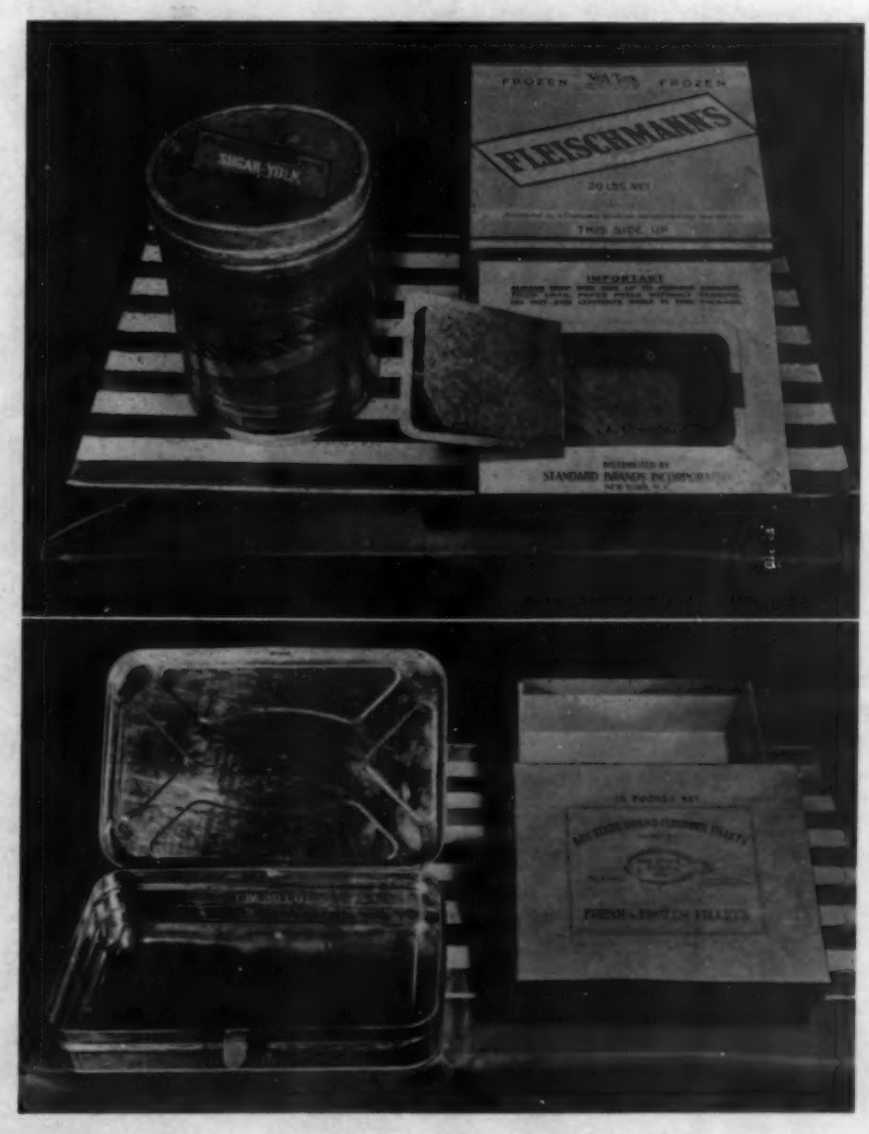
Buffalo Brake Beam Co., New York, to provide plant facilities in New York at a cost of $875,000.

American Distilling Co. Inc., New York, to provide additional plant facilities in Illinois at a cost of $125,000, resulting in an overall commitment of $750,000.

Lear Avia Inc., Piqua, O., to provide additional equipment for a plant in Ohio at a cost of $200,000, resulting in an overall commitment of $850,000.

Ford Motor Co., Dearborn, Mich, to provide additional plant facilities in Michigan, Missouri, Tennessee, Ohio and New York at a cost of $34,000,000, resulting in an overall commitment of $68,000,000.

Jacobs Aircraft Engine Co., Pottstown, Pa., to provide additional facilities at a plant in Pennsylvania at a cost of $350,000, resulting in an overall commitment of $21,000,000.




## Substitute Materials Replacing Steel and Tin Plate Containers

Extent to which tin plate may have lost a part of its former market permanently after the war canot now be estimated. There has been a vast development of cans, pails, boxes and other types of containers out of substitute materials as part of the program to conserve steel and tin. A good number believe that many of the new containers will continue to be used after the war.

Last year some 500 tons of tin plate were used in making containers for fresh and frozen fish; containers used this year are made of greaseproof paper and have a self-locking device. Some 3200 tons of tin plate were used last year for frozen egg containers. This year a "box-within-a-box" paperboard container is in use, the inner box—the freezing unit—being asphalt lined.

About 3500 tons of tin plate were used for making tobacco cans; now cardboard is used. The accompanying photographs show two of the "before and after" paper containers that were included in a large exhibit recently collected by the Containers Division, War Production Board. Other containers shown were for packaging coffee, candy, foods, drugs and delicate mechanical parts.

In addition many tin plate containers have been displaced by glass containers—and just how much of this displacement will prove to be permanent remains to be seen. The container field is one of many in which metals will be confronted with problems of regaining old markets.

## Briggs' War Contracts Total Half-Billion; Net Declines

War contracts held by Briggs Mfg. Co., Detroit, now amount to $500,000,000, and 94 per cent of the company's plants and facilities are engaged in production of bomber gun turrets, airplane wings and parts, tank hulls, shell casings, searchlight casings, exhaust flame dampeners for bombers and miscellaneous aircraft engine and plane parts, W. O. Briggs and W. P. Brown, chairman and president, announced in the annual report to stockholders.

Increasing volume of war orders in 1942 has practically doubled in dollar value of aircraft and ordnance output the company's peacetime rate. Number of employes is about 32,000 compared with a peacetime peak of 23,000. Report says 1943 business is expected to exceed last year by a substantial margin.

Working with some 2000 subcontractors, Briggs is handling a number of very large aircraft contracts.

Net income of Briggs in 1942 was $4,181,479, against $5,510,812 in preceding year. Total assets as of Dec. 31 were $64,302,927, and earned surplus, $21,894,324. Reserve for contingencies and postwar adjustments amounted to $1,626,246. Provision for federal taxes, less $220,000 postwar refund credit, was $5,150,000.

## Allegheny Ludlum Steel Corp.

W. F. Detwiler, chairman of the board, Allegheny Ludlum Steel Corp., Brackenridge, Pa., reports earnings of the corporation for the quarter ended March 31 totaled $1,419,240, after taxes based on the present tax rate and with no effect given to the postwar refund of 10 per cent. Net is equal to $1.08 a common share and compares with revised net profit of $915,644, or 69 cents a share in corresponding 1942 period.

## Sloss-Sheffield Steel & Iron

Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., earned first quarter net profit of $354,367 after provision for federal income and excess profits taxes, equal to $3.13 a share on common stock. This compares with $277,741, or $2.36 a common share for quarter ended March 31, 1942.

## Woodward Iron Co.

First quarter net income of Woodward Iron Co., Woodward, Ala., amounted to $251,815, or 75 cents a share, after provision for federal income and excess profits taxes and net of postwar refund. In comparable 1942 period net totaled $397,337, or $1.18 a share on the stock.

## STEEL CONSUMERS' COMBINED NET INCOME DECLINES 14 PER CENT

AGGREGATE net income of 227 iron and steel consumers was nearly 14 per cent less in 1942 than in preceding year. Combined earnings of the companies last year totaled $547,325,913 against $636,007,038 in 1941.

Accompanying tabulation lists 98 consumers; previous compilation of 72 companies appeared in STEEL, March 22, p. 62:

| | | |
|---|---|---|
| Air-Way Electric Appliance Corp., Toledo, O. | $ 187,183 | 162,701 |
| Allis-Chalmers Mfg. Co., Milwaukee | 5,923,992 | 5,743,567 |
| American Chain & Cable Co., Bridgeport, Conn. | 4,005,184 | 3,791,066 |
| American Locomotive Co., New York | 5,051,592 | 5,628,741 |
| American Machine & Foundry Co., New York | 1,132,251 | 1,374,032 |
| American Pulley Co., Philadelphia | 140,752 | 191,465 |
| American Meter Co. Inc., New York | 412,455 | 987,064 |
| American Safety Razor Corp., Brooklyn, N. Y. | 867,546 | 666,051 |
| Anchor Post Fence Co., Baltimore | 178,904 | 301,799 |
| Apex Electrical Mfg. Co., Cleveland | 212,004 | 597,186 |
| Automatic Signal Corp., East Norwalk, Conn. | 69,056 | 62,357 |
| Bath Iron Works Corp., Bath, Me. | 2,304,463 | 1,396,593 |
| Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. | 628,357 | 453,083 |
| Blaw-Knox Co., Pittsburgh | 1,425,718 | 1,668,311 |
| Briggs Mfg. Co., Detroit | 4,181,475 | 5,510,812 |
| Budd Mfg. Co., E. G., Philadelphia | 3,802,029 | 1,060,218 |
| Budd Wheel Co., Philadelphia | 1,752,269 | 1,754,882 |
| Bullard Co., Bridgeport, Conn. | 3,581,279 | 2,007,909 |
| Central Foundry Co., New York | 304,786 | 602,186 |
| Checker Cab Mfg. Corp., Kalamazoo, Mich. | 11,330 | 135,089 |
| City Auto Stamping Co., Toledo, O. | 541,217 | 524,214 |
| Coleman Lamp & Stove Co., Chicago | 405,524 | 672,589 |
| Cramp Shipbuilding Co., Philadelphia | 693,824 | 110,719 |
| Crosley Corp., Cincinnati | 1,931,659 | 1,493,135 |
| Diamond T Motor Car Co., Chicago | 2,043,939 | 1,365,377 |
| Dictaphone Corp., New York | 523,151 | 574,750 |
| Douglas Aircraft Inc., Santa Monica, Calif. | 11,054,620 | 18,176,690 |
| Eaton Mfg. Co., Cleveland | 3,481,003 | 4,364,696 |
| Electric Boat Co., New York | 2,904,341 | 2,831,541 |
| Emsco Derrick & Equipment Co., Los Angeles | 402,394 | 755,724 |
| Ex-Cell-O Corp., Detroit | 3,037,504 | ‡2,480,678 |
| Fairchild Aviation Corp., New York | 926,004 | 1,060,981 |
| Federal Mogul Corp., Detroit | 1,056,376 | 605,818 |
| Federal Motor Truck Co., Detroit | 536,848 | 819,641 |
| Ferro Enamel Corp., Cleveland | ‡181,421 | 499,794 |
| Florence Stove Co., Gardner, Mass. | 841,867 | 1,320,662 |
| Ford Motor Co. of Canada | 3,684,158 | 3,279,604 |
| General Cable Corp., New York | 2,136,171 | 3,937,921 |
| General Precision Equipment Corp., New York | 1,265,518 | 1,315,418 |
| General Railway Signal Co., Rochester, N. Y. | 917,548 | 796,991 |
| Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. | 1,068,926 | 659,629 |
| General Time Instruments Corp., New York | 692,836 | 1,228,923 |
| Gillette Safety Razor Co., Boston | 1,648,410 | 1,623,265 |
| Graham-Paige Motors Corp., Detroit | 1,635,249 | 690,536 |
| Hamilton Watch Co., Lancaster, Pa. | 822,886 | 957,524 |
| Hercules Motors Corp., Canton, O. | 752,092 | 943,100 |
| Hoskins Mfg. Co., Detroit | 523,460 | 603,672 |
| Hudson Motor Car Co., Detroit | 2,122,021 | 3,756,418 |
| Independent Pneumatic Tool Co., Chicago | 1,611,636 | 1,555,005 |
| Ingersoll-Rand Co., New York | 5,955,193 | 8,125,202 |
| International Business Machines Corp., New York | 8,679,755 | 9,844,633 |
| International Cigar Machinery Co., New York | 976,031 | 1,137,845 |
| International Machine Tool Corp., Elkhart, Ind. | 2,108,274 | *916,947 |
| Intertype Corp., New York | 269,996 | 365,003 |
| Lockheed Aircraft Corp., Burbank, Calif. | 8,163,721 | 7,416,537 |
| McGraw Electric Co., Chicago | 995,761 | 1,379,012 |
| McQuay-Norris Mfg. Co., St. Louis | 810,438 | 541,817 |
| Mack Trucks Inc., Long Island City, N. Y. | 2,988,432 | 2,944,319 |
| Martin Co., Glenn L., Baltimore | 6,658,809 | 5,773,148 |
| Maytag Co., Newton, Iowa | 703,459 | 1,625,646 |
| Midland Steel Products Co., Cleveland | 1,407,584 | 1,901,213 |
| Murray Ohio Mfg. Co., Cleveland | 277,280 | 273,844 |
| Muskegon Piston Ring Co., Muskegon, Mich. | 260,487 | 354,203 |
| National Can Corp., New York | ‡915,025 | 182,035 |
| National Enameling & Stamping Co., Milwaukee | 489,648 | 520,257 |
| New Britain Machine Co., New Britain, Conn. | 1,183,232 | 1,697,398 |
| North American Car Corp., Chicago | 638,817 | 553,177 |
| Package Machinery Co., Springfield, Mass. | 538,658 | 406,807 |
| Packard Motor Car Co., Detroit | 4,726,237 | 2,061,323 |
| Perfect Circle Co., Hagerstown, Ind. | 473,684 | 465,636 |
| Pittsburgh Forgings Co., Coraopolis, Pa. | 757,037 | 742,639 |
| Pittsburgh Screw & Bolt Corp., Pittsburgh | 970,153 | 1,249,831 |
| Pullman Inc., Wilmington, Del. | 10,361,210 | 10,918,820 |
| Pyrene Mfg. Co., Newark, N. J. | 315,776 | 337,757 |
| Raymond Concrete Pile Co., New York | 1,385,804 | 1,433,331 |
| Reed Roller Bit Co., Houston, Texas | 1,123,356 | 1,315,538 |
| Reo Motors Inc., Lansing, Mich. | 1,389,378 | 433,968 |
| Remington Arms Co. Inc., Bridgeport, Conn. | 3,354,024 | 3,058,839 |
| Republic Aviation Corp., Farmingdale, L. I., N. Y. | 1,105,061 | 781,119 |
| Scovill Mfg. Co., Waterbury, Conn. | 3,166,987 | 3,639,589 |
| Soss Mfg. Co., Roselle, N. J. | 89,909 | 49,574 |
| Sperry Corp., New York | 5,777,962 | 8,281,511 |
| Square D. Co., Detroit | 2,769,195 | 3,104,343 |
| Stewart-Warner Corp., Chicago | 1,590,454 | 1,656,683 |
| Superheater Co., New York | 1,497,250 | 1,632,573 |
| Thew Shovel Co., Lorain, O. | 703,230 | 809,450 |
| Timken-Detroit Axle Co., Detroit | ..... | ..... |
| Twin Coach Co., Kent, O. | 488,543 | 706,856 |
| Underwood Elliott Fisher Co., New York | ..... | ..... |
| United-Carr Fastener Corp., Cambridge, Mass. | 751,592 | 1,069,023 |
| Universal Products Co., Dearborn, Mich. | 313,966 | 273,786 |
| United States Pipe & Foundry Co., Burlington, N. J. | 2,855,646 | 2,614,586 |
| Victor Equipment Co., San Francisco | 262,166 | 202,797 |
| Wellman Engineering Co., Cleveland | ‡426,996 | ‡319,407 |
| Wickwire Spencer Steel Co., New York N. J. | 727,906 | 937,638 |
| Western Electric Co. Inc., New York | 7,548,394 | 18,427,536 |
| White Motor Co., Cleveland | 3,189,119 | 2,753,915 |
| White Sewing Machine Co., Cleveland | 498,360 | 673,583 |
| Yale & Towne Mfg. Co., Philadelphia | 1,248,711 | 1,669,386 |
| Youngstown Steel Door Co., Youngstown, O. | 750,145 | 1,373,651 |

‡Excludes results of foreign subsidiaries. ‡11 Months. *10 Months. †Net loss.

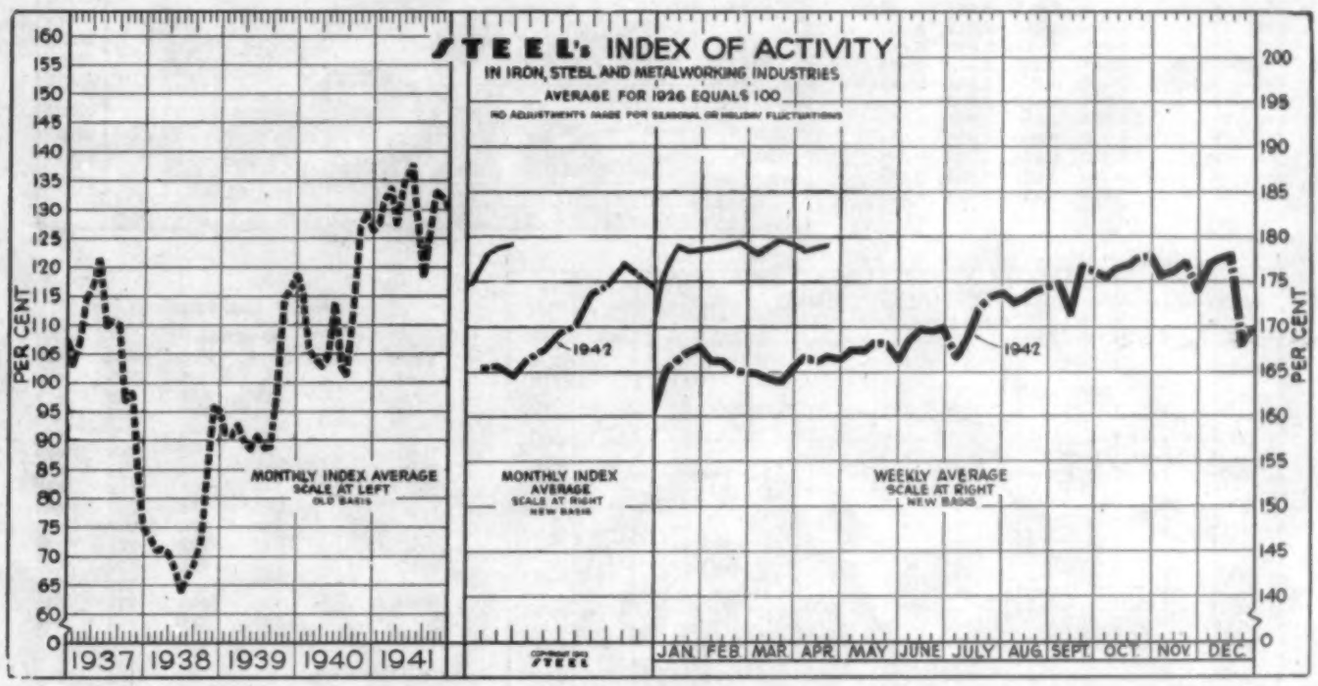
# Outlook for Machine Tools Less Promising

EVEN though some machine tool builders have sufficient backlogs to hold operations at capacity for months to come, a gradual shrinkage of the industry's total output from now on seems reasonably certain. That it has been "producing itself out of business" is witnessed by a bank of completed tools equivalent to more than 20 years normal demand. That the industry is preparing for difficult times is evident from member reports of huge reserves for postwar contingencies. Few tools will prove expendable in the war effort.

In 1942, machine tool units shipped were valued at $1,318,897,000, or 42 per cent more than the 1941 total, reaching the unprecedented monthly figure of $131,960,000 in December. But January, 1943 shipments declined 11 per cent to $117,432,000, while February showed a 2.6 per cent drop to $114,372,000, (chart, p. 83). Order backlogs fell 8.1 per cent and 7.9 per cent, respectively. Government estimates place 1943 output about 10 per cent below last year's peak level.

A number of manufacturers are exploring the possibilities of producing ordnance items for the duration and a few are actually working on contracts of this nature. Yet the postwar implications remain a sore spot. If, in fixing profit margins of producers, renegotiators recognize that the industry is indispensable to keep modernized the nation's industrial machine and that it is an ace in the hole in case of another war, the profits built from war trade will help to weather the dry period.

STEEL's index of activity rose 0.5 point to 179.3 in the week ending April 17. This compares with 166.7 in like week a year ago and 124.2 in corresponding period of 1941.



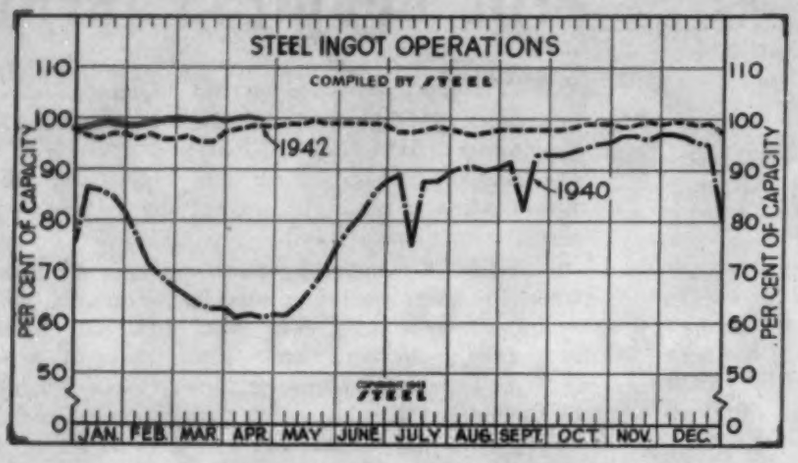

*STEEL'S index of activity rose 0.5 point in the week ending April 17:*

| Week Ended | 1943 | 1942 |
|---|---|---|
| April 17 | 179.3† | 166.7 |
| April 10 | 178.8 | 166.2 |
| April 3 | 178.5 | 166.7 |
| Mar. 27 | 179.2 | 165.5 |
| Mar. 20 | 179.6 | 163.9 |
| Mar. 13 | 179.0 | 164.1 |
| Mar. 6 | 178.2 | 164.8 |
| Feb. 27 | 178.9 | 165.0 |
| Feb. 20 | 179.0 | 165.1 |
| Feb. 13 | 178.8 | 166.2 |
| Feb. 6 | 178.6 | 166.3 |

†Preliminary.

| Mo. Data | 1943 | 1942 | 1941 | 1940 | 1939 | 1938 | 1937 | 1936 | 1935 | 1934 | 1933 | 1932 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan. | 178.1 | 165.7 | 127.3 | 114.7 | 91.1 | 73.3 | 102.9 | 85.9 | 74.2 | 58.8 | 48.6 | 54.6 |
| Feb. | 178.8 | 165.6 | 132.3 | 105.8 | 90.8 | 71.1 | 106.8 | 84.3 | 82.0 | 73.9 | 48.2 | 55.3 |
| March | 179.0 | 164.6 | 133.9 | 104.1 | 92.6 | 71.2 | 114.4 | 87.7 | 83.1 | 78.9 | 44.5 | 54.2 |
| April | . . . | 166.7 | 127.2 | 102.7 | 89.8 | 70.8 | 116.6 | 100.8 | 85.0 | 83.6 | 52.4 | 52.8 |
| May | . . . | 167.7 | 134.8 | 104.6 | 88.4 | 67.4 | 121.7 | 101.8 | 81.8 | 83.7 | 63.5 | 54.8 |
| June | . . . | 169.4 | 138.7 | 114.1 | 90.9 | 68.4 | 109.9 | 100.3 | 77.4 | 80.6 | 70.3 | 51.4 |
| July | . . . | 171.0 | 128.7 | 102.4 | 85.5 | 66.2 | 110.4 | 100.1 | 75.3 | 65.7 | 77.1 | 47.1 |
| Aug. | . . . | 173.5 | 118.1 | 101.1 | 83.9 | 68.7 | 110.0 | 97.1 | 76.7 | 66.0 | 74.1 | 45.0 |
| Sept. | . . . | 174.8 | 126.4 | 113.5 | 96.0 | 72.5 | 96.8 | 86.7 | 69.7 | 56.9 | 68.0 | 46.5 |
| Oct. | . . . | 176.9 | 133.1 | 127.8 | 114.9 | 83.6 | 98.1 | 94.8 | 77.0 | 56.4 | 63.1 | 48.4 |
| Nov. | . . . | 175.8 | 132.2 | 129.5 | 116.2 | 95.9 | 84.1 | 106.4 | 88.1 | 54.9 | 52.8 | 47.5 |
| Dec. | . . . | 174.1 | 130.2 | 126.3 | 118.9 | 95.1 | 74.7 | 107.6 | 88.2 | 58.9 | 54.0 | 46.2 |

**Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production**




**Steel Ingot Operations**

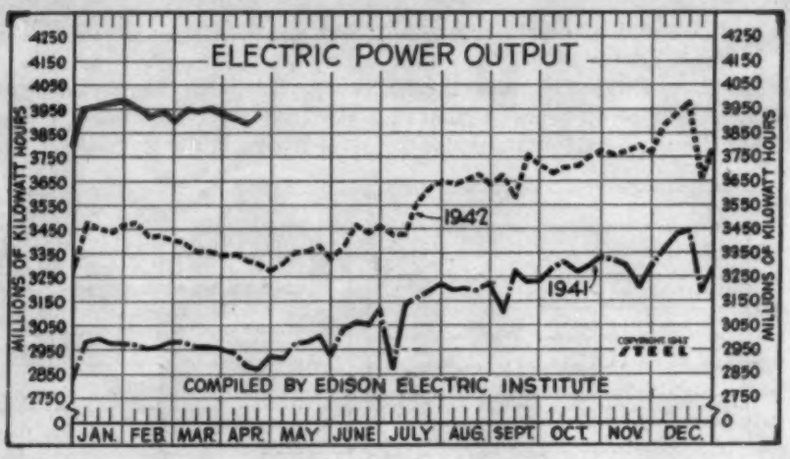
(Per Cent)

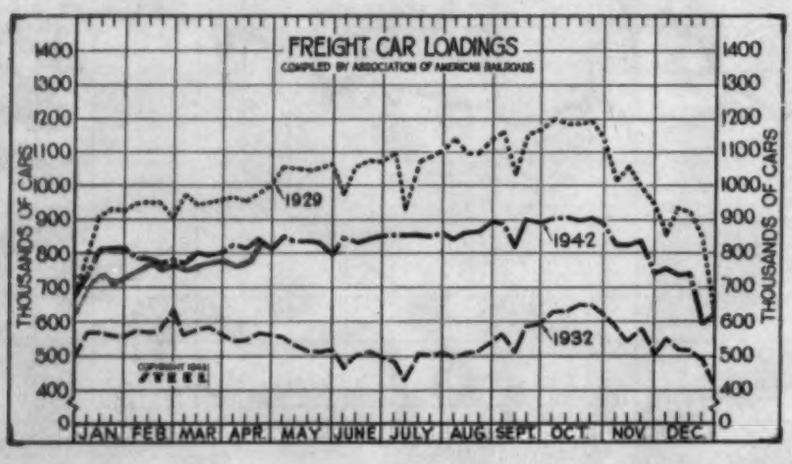
| Week ended | 1943 | 1942 | 1941 | 1940 |
|---|---|---|---|---|
| April 17 | 99.0 | 98.5 | 98.0 | 61.5 |
| April 10 | 99.5 | 98.5 | 98.0 | 61.0 |
| April 3 | 99.5 | 98.0 | 98.0 | 61.5 |
| Mar. 27 | 99.0 | 97.5 | 99.5 | 61.0 |
| Mar. 20 | 99.5 | 95.5 | 99.5 | 62.5 |
| Mar. 13 | 99.0 | 95.5 | 98.5 | 62.5 |
| Mar. 6 | 99.5 | 96.5 | 97.5 | 63.5 |
| Feb. 27 | 99.5 | 96.0 | 96.5 | 65.5 |
| Feb. 20 | 99.5 | 96.0 | 94.5 | 67.0 |
| Feb. 13 | 99.0 | 97.0 | 96.5 | 69.0 |
| Feb. 6 | 98.5 | 96.0 | 97.0 | 71.0 |
| Jan. 30 | 98.5 | 97.0 | 97.0 | 76.5 |
| Jan. 23 | 99.0 | 97.0 | 95.5 | 84.5 |
| Jan. 16 | 99.0 | 96.0 | 94.5 | 84.5 |
| Jan. 9 | 97.5 | 96.5 | 93.0 | 86.0 |
| Jan. 2 | 97.5 | 97.5 | 92.5 | 86.5 |

**Electric Power Output**

(Million KWH)

| Week ended | 1943 | 1942 | 1941 | 1940 |
|---|---|---|---|---|
| April 17 | 3,917 | 3,308 | 2,702 | 2,422 |
| April 10 | 3,882 | 3,321 | 2,721 | 2,418 |
| April 3 | 3,890 | 3,349 | 2,779 | 2,381 |
| Mar. 27 | 3,928 | 3,345 | 2,802 | 2,422 |
| Mar. 20 | 3,947 | 3,357 | 2,809 | 2,424 |
| Mar. 13 | 3,945 | 3,357 | 2,818 | 2,460 |
| Mar. 6 | 3,946 | 3,392 | 2,835 | 2,464 |
| Feb. 27 | 3,893 | 3,410 | 2,825 | 2,479 |
| Feb. 20 | 3,949 | 3,424 | 2,820 | 2,455 |
| Feb. 13 | 3,939 | 3,422 | 2,810 | 2,476 |
| Feb. 6 | 3,960 | 3,475 | 2,824 | 2,523 |
| Jan. 30 | 3,977 | 3,468 | 2,850 | 2,541 |
| Jan. 23 | 3,974 | 3,440 | 2,980 | 2,661 |
| Jan. 16 | 3,952 | 3,450 | 2,996 | 2,674 |
| Jan. 9 | 3,953 | 3,473 | 2,985 | 2,688 |
| Jan. 2 | 3,780 | 3,289 | 2,831 | 2,558 |
| Dec. 26 | 3,656 | 3,234 | 2,757 | 2,465 |


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.




**Freight Car Loadings**

(1000 Cars)

| Week ended | 1943 | 1942 | 1941 | 1940 |
|---|---|---|---|---|
| April 17 | 801† | 847 | 709 | 628 |
| April 10 | 789 | 814 | 680 | 619 |
| April 3 | 772 | 829 | 683 | 603 |
| Mar. 27 | 787 | 805 | 792 | 628 |
| Mar. 20 | 768 | 797 | 768 | 620 |
| Mar. 13 | 769 | 799 | 758 | 619 |
| Mar. 6 | 748 | 771 | 742 | 621 |
| Feb. 27 | 783 | 781 | 757 | 634 |
| Feb. 20 | 752 | 775 | 678 | 595 |
| Feb. 13 | 765 | 783 | 721 | 608 |
| Feb. 6 | 755 | 784 | 710 | 627 |
| Jan. 30 | 735 | 816 | 714 | 657 |
| Jan. 23 | 709 | 818 | 711 | 649 |
| Jan. 16 | 755 | 811 | 703 | 646 |

†Preliminary.

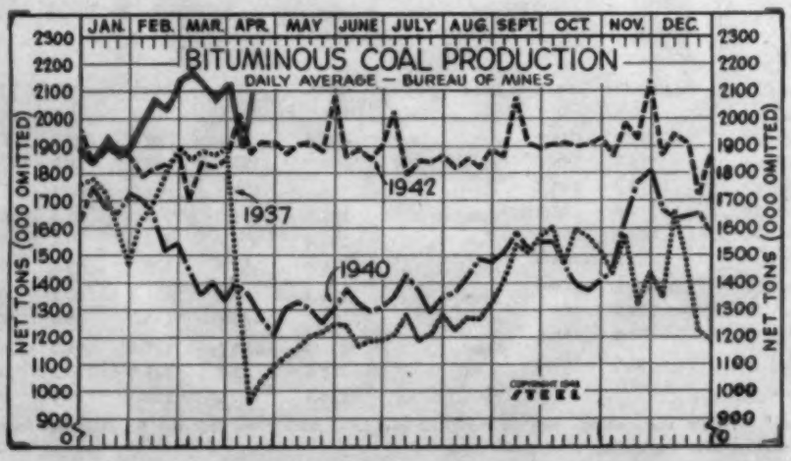
**Bituminous Coal Production**

Daily Average

Net Tons (000 omitted)

| Week ended | 1943 | 1942 | 1941 | 1937 |
|---|---|---|---|---|
| April 10 | 2,075† | 1,875 | 200 | 953 |
| April 3 | 1,858 | 2,019 | 665 | 1,381 |
| Mar. 27 | 2,108 | 1,858 | 1,950 | 1,895 |
| Mar. 20 | 2,060 | 1,825 | 1,879 | 1,871 |
| Mar. 13 | 2,100 | 1,842 | 1,844 | 1,883 |
| Mar. 6 | 2,125 | 1,693 | 1,791 | 1,851 |
| Feb. 27 | 2,118 | 1,878 | 1,736 | 1,897 |
| Feb. 20 | 2,027 | 1,833 | 1,736 | 1,807 |
| Feb. 13 | 2,063 | 1,817 | 1,736 | 1,696 |
| Feb. 6 | 1,980 | 1,793 | 1,683 | 1,634 |
| Jan. 30 | 1,900 | 1,866 | 1,684 | 1,466 |
| Jan. 23 | 1,867 | 1,886 | 1,656 | 1,605 |
| Jan. 16 | 1,929 | 1,883 | 1,609 | 1,731 |

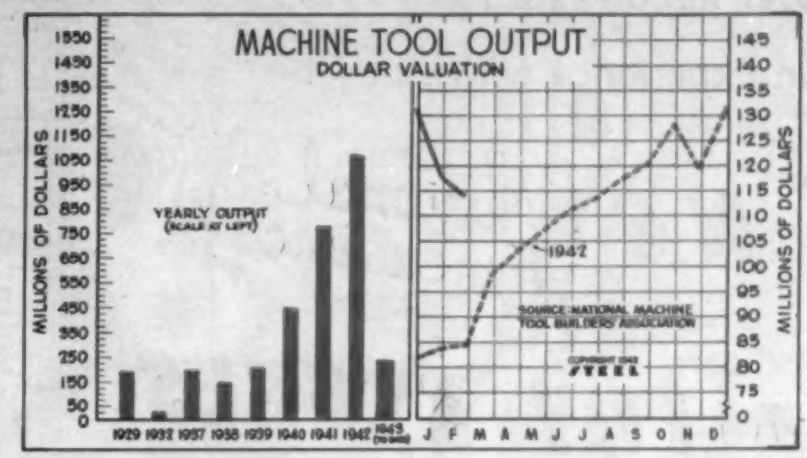
†Preliminary.

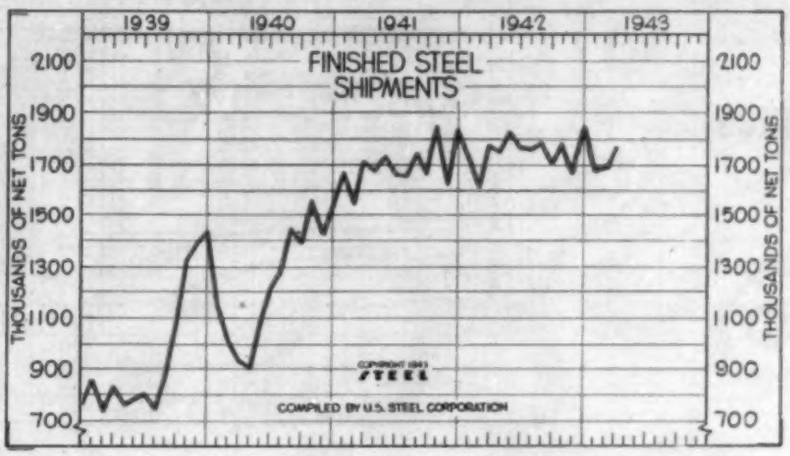

BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

## Machine Tool Output
(000 omitted)

| | 1943 | 1942 | 1941 |
|---|---|---|---|
| Jan. | $117,432 | $83,547 | $50,700 |
| Feb. | 114,372 | 84,363 | 54,000 |
| Mar. | | 98,358 | 57,400 |
| April | | 103,364 | 60,300 |
| May | | 107,297 | 60,800 |
| June | | 111,147 | 63,000 |
| July | | 113,600 | 57,900 |
| Aug. | | 117,343 | 64,300 |
| Sept. | | 120,118 | 68,400 |
| Oct. | | 128,800 | 77,200 |
| Nov. | | 119,000 | 74,600 |
| Dec. | | 131,960 | 81,435 |

| Year | |
|---|---|
| 1942 | 1,318,897 |
| 1941 | 775,300 |
| 1940 | 450,000 |
| 1939 | 210,000 |


MACHINE TOOL OUTPUT
DOLLAR VALUATION
MILLIONS OF DOLLARS
YEARLY OUTPUT
(SCALE AT LEFT)
1942
SOURCE: NATIONAL MACHINE TOOL BUILDERS' ASSOCIATION
STEEL
1929 1932 1937 1938 1939 1940 1941 1942 1943
J F M A M J J A S O N D

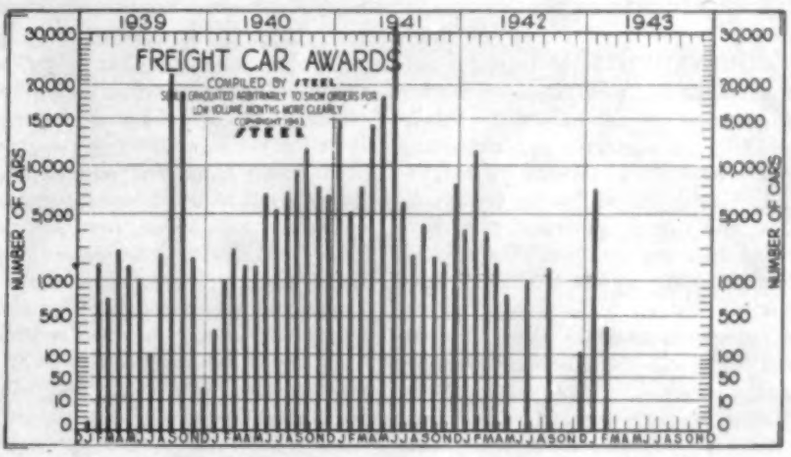


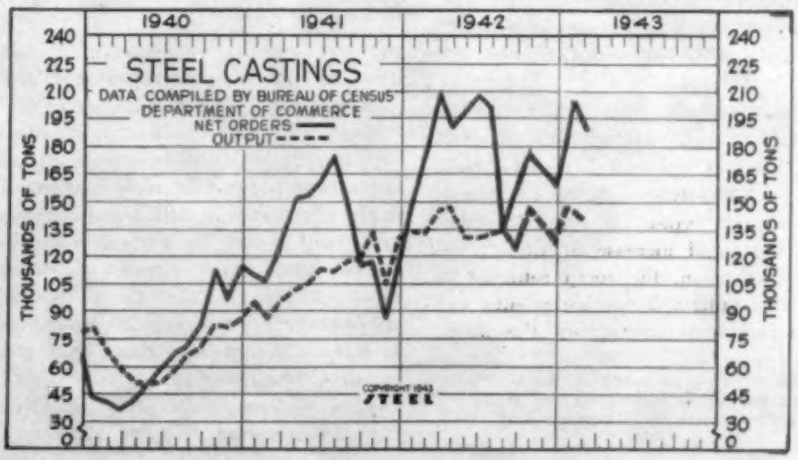

## Finished Steel Shipments
U. S. Steel Corp.
(Unit 1000 Net Tons)

| | 1943 | 1942 | 1941 | 1940 | 1939 |
|---|---|---|---|---|---|
| Jan. | 1685.9 | 1738.9 | 1682.5 | 1145.6 | 870.9 |
| Feb. | 1691.5 | 1616.6 | 1548.5 | 1009.3 | 747.4 |
| Mar. | 1772.4 | 1780.9 | 1720.4 | 931.9 | 845.1 |
| Apr. | | 1758.9 | 1687.7 | 907.9 | 771.8 |
| May | | 1834.1 | 1745.3 | 1084.1 | 795.7 |
| June | | 1774.1 | 1668.6 | 1209.7 | 807.6 |
| July | | 1765.7 | 1666.7 | 1296.9 | 745.4 |
| Aug. | | 1788.7 | 1753.7 | 1455.6 | 885.6 |
| Sept. | | 1703.6 | 1664.2 | 1392.8 | 1086.7 |
| Oct. | | 1787.5 | 1851.3 | 1572.4 | 1345.9 |
| Nov. | | 1665.5 | 1624.2 | 1425.4 | 1406.2 |
| Dec. | | 1849.6 | 1846.0 | 1544.6 | 1444.0 |
| Tot. | | 20,458.9 | 15,013.7 | 11707.3 | |

## Freight Car Awards

| | 1943 | 1942 | 1941 | 1940 |
|---|---|---|---|---|
| Jan. | 7,415 | 4,253 | 15,169 | 360 |
| Feb. | 330 | 11,725 | 5,508 | 1,147 |
| March | 0 | 4,080 | 8,074 | 3,104 |
| April | | 2,125 | 14,645 | 2,077 |
| May | | 822 | 18,630 | 2,010 |
| June | | 0 | 32,749 | 7,475 |
| July | | 1,025 | 6,459 | 5,846 |
| Aug. | | 0 | 2,668 | 7,525 |
| Sept. | | 1,863 | 4,470 | 9,735 |
| Oct. | | 0 | 2,499 | 12,195 |
| Nov. | | 0 | 2,222 | 8,234 |
| Dec. | | 135 | 8,406 | 7,181 |
| Total | | 26,028 | 121,499 | 66,889 |


1939 1940 1941 1942 1943
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
STEEL
NUMBER OF CARS




## Steel Castings

| | Net Orders | | Production | |
|---|---|---|---|---|
| | 1943 | 1942 | 1943 | 1942 |
| Jan. | 206,737 | 150,551 | 149,368 | 134,778 |
| Feb. | 191,214 | 179,880 | 144,586 | 133,726 |
| Mar. | | 211,081 | | 146,507 |
| Apr. | | 191,195 | | 149,625 |
| May | | 199,619 | | 131,492 |
| June | | 208,243 | | 131,458 |
| July | | 201,334 | | 134,461 |
| Aug. | | 140,673 | | 139,059 |
| Sept. | | 171,265 | | 135,823 |
| Oct. | | 175,484 | | 149,268 |
| Nov. | | 169,862 | | 137,428 |
| Dec. | | 161,147 | | 130,207 |
| Tot. | | 2,160,334 | | 1,653,832 |

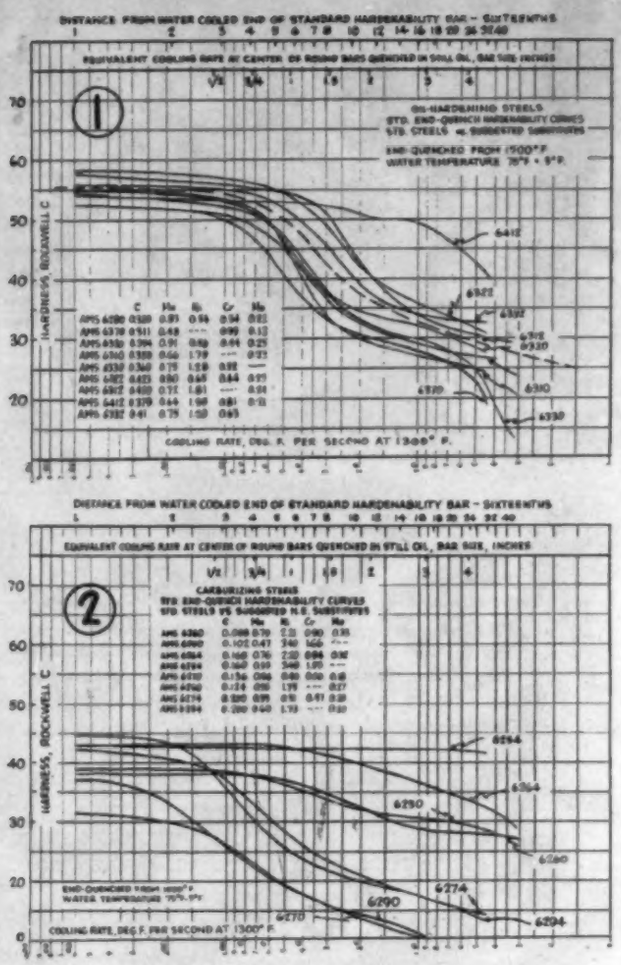
*User Report No. 13*

*on Experience with . . . .*

# NE (National Emergency) ALLOY STEELS

## . . . . in aircraft engines

By MEL YOUNG
And
H. H. HANINK
Wright Aeronautical Corp.
Paterson, N. J.


DISTANCE FROM WATER COOLED END OF STANDARD HARDENABILITY BAR – SIXTEENTHS
EQUIVALENT COOLING RATE AT CENTER OF ROUND BARS QUENCHED IN STILL OIL, BAR SIZE, INCHES
OIL-HARDENING STEELS
STD. END-QUENCH HARDENABILITY CURVES
STD. STEELS vs. SUGGESTED SUBSTITUTES
END-QUENCHED FROM 1500° F.
WATER TEMPERATURE 70°F ± 5° F.
HARDNESS, ROCKWELL C
COOLING RATE, DEG. F. PER SECOND AT 1300° F.
6412
6325
6332
6370
6320
6310
6330




ACHIEVEMENTS in aircraft construction in the past fifteen or twenty years appear to center about the "glamour" alloys of aluminum and magnesium with a tendency to overshadow the important roles played by the ferrous alloys and other materials that have forced their way into use. The tremendous demands of war production have now revealed our resource shortages and in our efforts to build war and transport machines, it has become necessary to take conservative measures with some elements in particular and with all materials in general. Such changes in other times would probably never be made or if so, without notoriety.

Today, almost everyone has heard of "substitute" or "National Emergency" steels; of synthetic rubber and new uses for plastics. The application of new materials to aircraft engines, born of necessity rather than by performance promise, has not been particularly spectacular but is nevertheless of interest. All changes are motivated by the necessity for conserving strategic materials; *all must be made with no sacrifice in existing quality* and with an open mind to the designer's trend toward increased strength and power.

Aircraft engines, in common with other war-time products using alloy steels, will soon have an almost completely new set of alloy steel compositions for the majority of working parts. These steels have been selected by the SAE Aircraft Materials and Processes Coordinating Subdivision from the well-known NE (National Emergency) series, which has been designed to make our strategic alloying elements, nickel, chromium, molybdenum, vanadium and tungsten, stretch to cover our rapidly increasing alloy steel production without sacrificing necessary physical properties. Those NE compositions selected have been incorporated in Aircraft Material Specifications and are now designated as AMS alternates. They are listed in Table I.

With the exception of AMS-6415 (SAE-4340) steel, aircraft engine steels have been of the nickel, nickel-chromium, nickel-molybdenum or chromium-molybdenum types. It is obvious that with the rapid increase in aircraft engine production, the scrap returned to the steel mills will involve greater and more important tonnage of the above alloying elements. Segregation of this scrap by the manufacturers and the steel mills has become increasingly difficult, with the result that residual chromium and molybdenum in nickel steels, molybdenum in nickel-chromium steels, chromium in nickel-molybdenum steels and nickel in chromium-molybdenum steels have already shown a rapid increase. Since these residual alloys make no necessary improvements in the steels containing them, they are, in effect, being wasted.

It is the purpose of the NE steels

(*Please turn to Page* 126)

*Fig. 1—End-quench hardenability curves for nine AMS steels*

*Fig. 2—End-quench hardenability curves for eight other AMS steels*

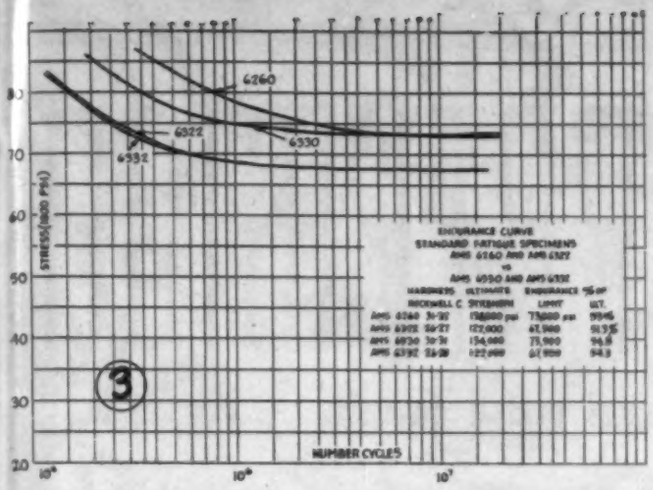
*Fig. 3—Endurance curves for four AMS steels*

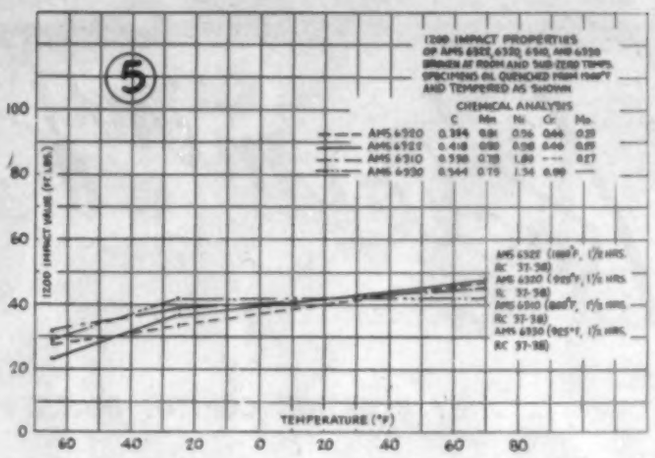
*Fig. 4—Endurance curves for three other AMS steels*

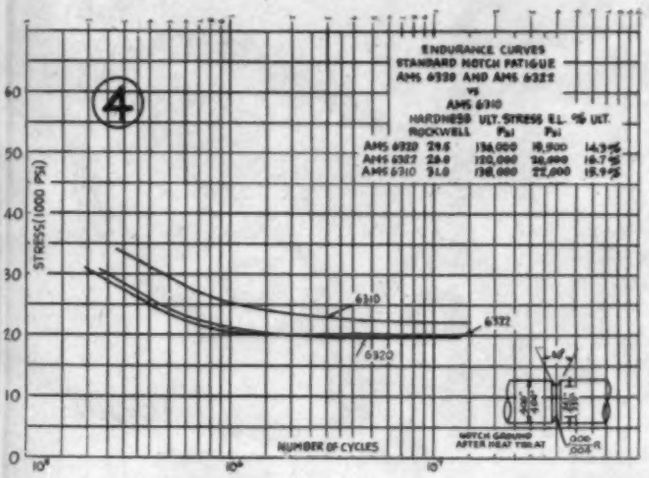
*Fig. 5—Impact test results on four AMS steels*

*Fig. 6 — Hardness-depth curves. Dotted portions show significant results of refrigeration*

From a paper presented at the war engineering production meeting of the Society of Automotive Engineers, Detroit, Jan. 11-15, 1943.



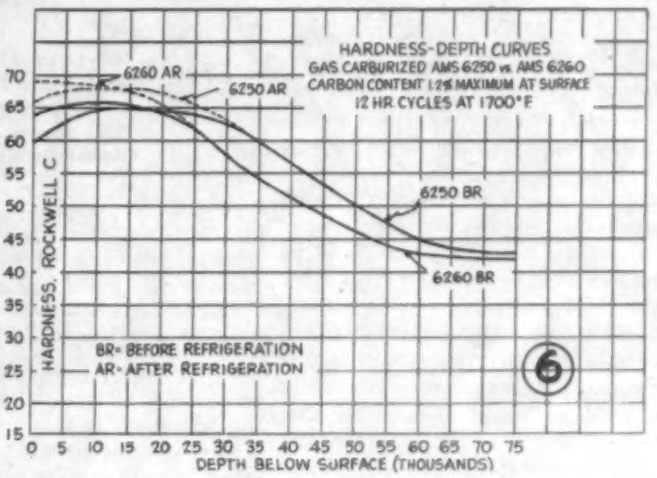




**TABLE I—Tentative Alternate Steel Composition—Aircraft Quality**

| AMS No. | Form | Carbon | Manganese | Nickel | Chromium | Molybdenum | Superseded AMS No. | Typical Usage |
|---|---|---|---|---|---|---|---|---|
| 6260 | Bar | .08/.13 | .70/.90 | 2.0/2.5 | .80/1.10 | .30/.40 | | All highly |
| | | .08/.13 | .45/.60 | 3.25/3.75 | 1.40/1.75 | | 6250 | stressed car- |
| | | .09/.14 | .45/.60 | 4.75/5.25 | | | 6240 | burized gears |
| 6262* | Bar & Forgings | .08/.13 | .70/.90 | 2.0/2.5 | .80/1.10 | .30/.40 | 6252† | Carburized crankshaft |
| 6264 | Bar & | .15/.20 | .70/.90 | 2.0/2.5 | .80/1.10 | .30/.40 | | Carburized starter & |
| | Forgings | .14/.19 | .45/.60 | 3.25/3.75 | 1.40/1.75 | | 6254 | accessory drive shaft; supercharger impeller drive shaft |
| 6270 | Bar & | .12/.17 | .70/.90 | .40/.60 | .40/.60 | .15/.25 | | Carburized bearing |
| | Forgings | .11/.17 | .45/.60 | 1.65/2.00 | | .20/.30 | 6290 | rings and spacers; valve tappet guides |
| 6274 | Bar & | .18/.23 | .70/.90 | .40/.60 | .40/.60 | .15/.25 | | Carburized tappet |
| | Forgings | .17/.22 | .45/.60 | 1.65/2.00 | | .20/.30 | 6294 | rollers and pins |
| 6280 | Bar & | .27/.33 | .70/.90 | .40/.60 | .40/.60 | .15/.25 | | Welded Assys. |
| | Forgings | .27/.33 | .40/.60 | | .80/1.10 | .15/.25 | 6370 | |
| 6320 | Bar | .33/.38 | .75/1.00 | .40/.60 | .40/.60 | .20/.30 | | All important |
| | | .33/.38 | .60/.80 | 1.65/2.00 | | .20/.30 | 6310 | studs, nuts and |
| | | .33/.38 | .60/.80 | 1.10/1.40 | .55/.75 | | 6330 | bolts |
| 6322 | Bar & | .38/.43 | .75/1.00 | .40/.60 | .40/.60 | .20/.30 | | Crankcase sections, |
| | Forgings | .38/.43 | .60/.80 | 1.65/2.00 | | .20/.30 | 6312 | valve spring washers |
| | | .40/.45 | .60/.90 | 1.00/1.50 | .45/.75 | | 6332 | & locks, rocker arms; |
| | | .35/.42 | .70/.90 | | .80/1.10 | .15/.25 | 6380 | general purposes for |
| | | .38/.43 | .75/1.00 | | .80/1.10 | .15/.25 | 6382 | medium to light sections |
| 6337 | Sheet | .33/.38 | .75/1.00 | .40/.60 | .40/.60 | .20/.30 | | Baffle clips and |
| | | .30/.35 | .40/.60 | | .80/1.10 | .15/.25 | 6352 | brackets |
| 6330 | Tubing | .27/.33 | .70/.90 | .40/.60 | .40/.60 | .15/.25 | | Oil transfer tubes and |
| | | .27/.33 | .40/.60 | | .80/1.10 | .15/.25 | 6360 | welded ass'ys where heat treatment is necessary |
| 6335 | Tubing | .33/.38 | .75/1.00 | .40/.60 | .40/.60 | .20/.30 | | |
| | | .32/.39 | .40/.60 | | .80/1.10 | .15/.25 | 6365 | Push rods |

List prepared by SAE Aircraft Materials and Processes Coordinating Subdivision.
Limits: silicon 0.20 to 0.35%; phosphorus and sulfur each 0.04% max.
*Same as 6260, except for higher hardenability requirements.
†Same as 6250, except for higher hardenability requirements.

# Reclaiming PRECISION

## . . . . by accurate control of chromium plated deposits

By WILLIAM IRBY
A. T. CLARKE
F. R. GROVER
Lynn River Works
General Electric Co.

ONLY RECENTLY have the possibilities of reclaiming precision gages and tools through the use of chromium plating been fully realized. According to experts in the precision gage field, the process of refinishing an undersized gage would be extremely simplified if the operation of the chromium plating solution could be so controlled as to obtain an even, hard, bright chromium plate, free of natural build-up on the high points and edges. By such a process a precision gage that was worn undersized and therefore worthless could be made as good as new, with perhaps better and longer wearing qualities than a new gage—all obtained at a much smaller cost than that of a new gage.

Since the huge volume of war production work has brought about a shortage of precision gages and small tools in general, there has been increased pressure brought to bear upon the undertaking of immediate experimental work in this field. Although this field has been investigated before, exact and necessary information needed to go immediately into actual production was not readily available. Thus, it was necessary to make our own investigation to determine how best to reclaim various types of gages and tools.

The process of chromium plating has been used to a large extent for two entirely different purposes—to produce a bright corrosion resistant finish and to build up an undersized object so that it may again be machined to proper size. Although the quality of the chromium deposit in both cases is the same, the two types of plating have been distinguished as "decorative chrome" and "hard chrome".

The first process consists merely in plating approximately a few hundred thousandths of an inch of plate on a metallic surface that has already been polished and protected from corrosion, generally with electrolytic copper and nickel. The object here is to obtain a brillant finish, thickness of plate not being important. On the other hand, "hard chrome" plating involves many problems caused by prolonged plating in the chromium bath.

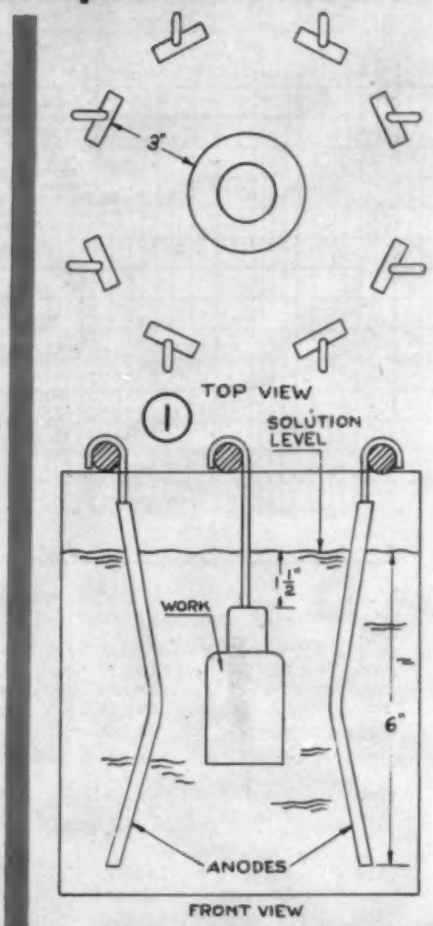
It is a characteristic of all types of electroplating for the plate to build up more on the edges and high points than on low points or the middle of flat surfaces, since the attraction of the metallic particles to the object at the cathode follows a pattern similar to that of a magnetic field.

### Four Ways To Plate Evenly

An illustration of this can be made by reference to the actual results obtained in plating the cylindrical surface of a shaft. Experience has shown that the diameter at the ends of the cylinder increases two or three times as much as does the diameter of the middle portion. This does not include the chromium deposited on the ends in the form of small beads, which is due to the effect commonly known as "treeing". If a grinding operation is to follow, this effect does not necessarily have to be considered. The only necessary consideration is that the thickness of the plate be sufficient at the thinnest spot.

If the plating is to be carried out to any degree of precision, that is, if it is desired to deposit a layer of chromium of an accurate and uniform thickness, so that the object has only to be polished or lapped down to size, then the above effects must be eliminated or at least minimized to a great extent.

*There are four common means of obtaining an even plate.* All are based on the relative arrangement of the anode and cathode with respect to the pattern of the plating field which will be set up between them. The first has regard to the *proper arrangement and design of the anodes,* the general principle being to have all parts of the work equidistant from the corresponding or opposite anode area.




The second is by *the use of shields,* which are objects used to divert the direction or pattern of the current flow through the plating solutions.

A third lies in *the design or method of racking or wiring the work* to obtain the contact between the cathode bus bar and the solution.

The fourth is through *the use of* "thieves". These are objects placed in contact with the cathode and close to high points of the work or around the

# GAGES

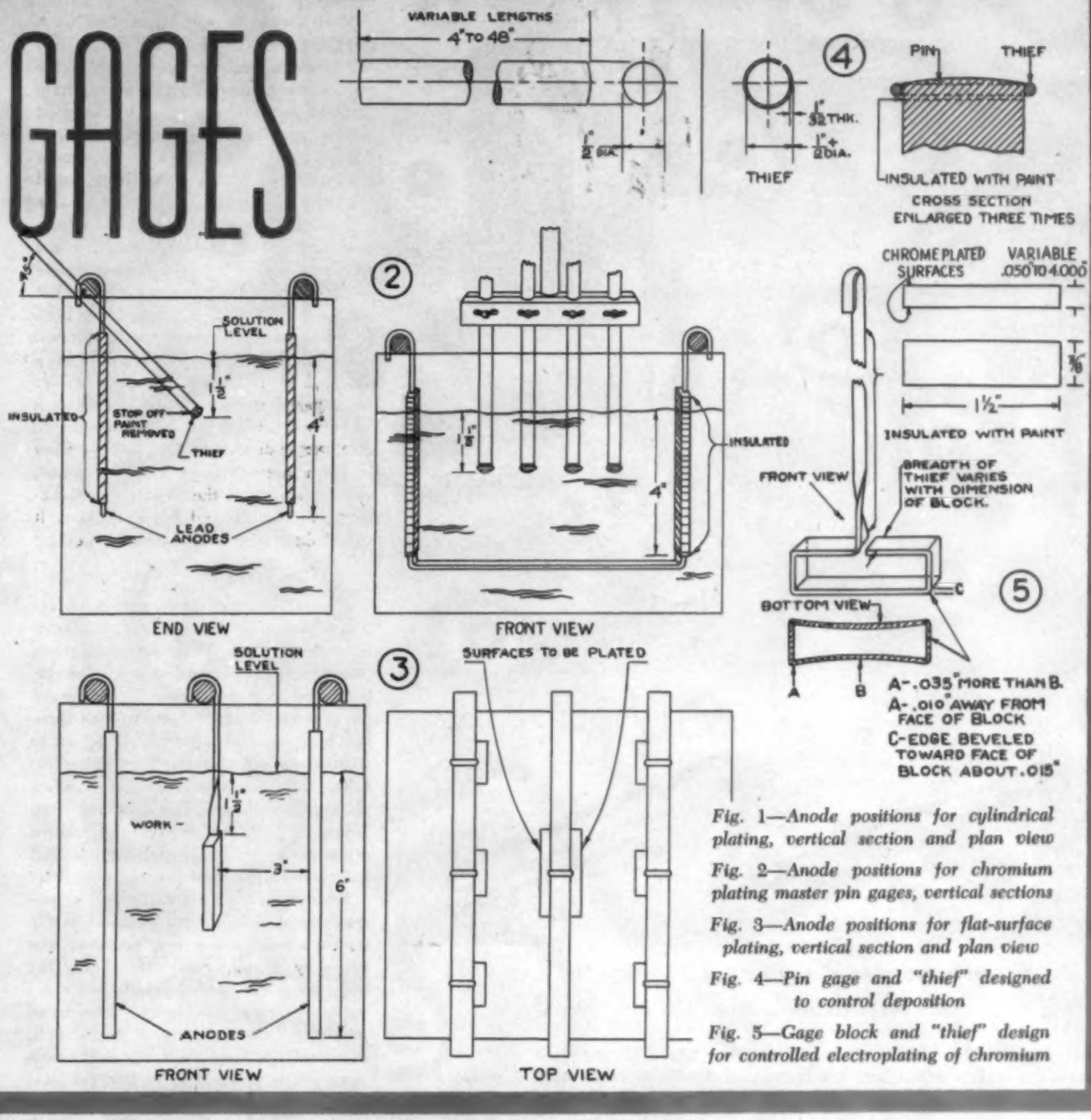



*Fig. 1—Anode positions for cylindrical plating, vertical section and plan view*

*Fig. 2—Anode positions for chromium plating master pin gages, vertical sections*

*Fig. 3—Anode positions for flat-surface plating, vertical section and plan view*

*Fig. 4—Pin gage and "thief" designed to control deposition*

*Fig. 5—Gage block and "thief" design for controlled electroplating of chromium*

edges to rob them of the excess plating. It is often difficult to distinguish among these four types, since usually a combination of these four is most effective.

The principles behind these four methods have been understood and employed in plating shops for some time. However, the time and care have rarely been taken to arrive at the various designs and measurements necessary to obtain the optimum results, which we sought for reclaiming precision gages.

**General Experimental Procedure:** Our first step in attempting to obtain a uniform thickness of the deposits on a gage was to decide upon the best method of racking the work. Some types of work were merely supported from the cathode bar by a copper wire, while others were eventually placed in a specially designed rack. The choice generally was made with regard to the opportunities offered by the shape of the object.

The next consideration was the selection of the type of "thief" or shield that would probably produce the most even deposit. If convenient, this was included in the design of the rack. For example, in plating an object in the shape of a block, the most obvious selection would be a rack that would cover the blocks on all surfaces adjacent to the one to be plated. By extending the rack slightly beyond the surface to be plated, the rack itself becomes a natural thief for robbing the edges of the surface from excess plating.

Often an efficient thief is formed from ordinary copper wire, which is in contact with the work on a surface to be covered with insulation. It has been found that sheet lead, because it is so easily shaped, can be made into excellent shields that will divert the deposition of chromium metal away from the edges and high points of the work. These shields may or may not be in contact with the cathode, but it must be realized that each setup produces a different effect. The success of the first attempt at racking and "thieving" a gage depends upon the op-

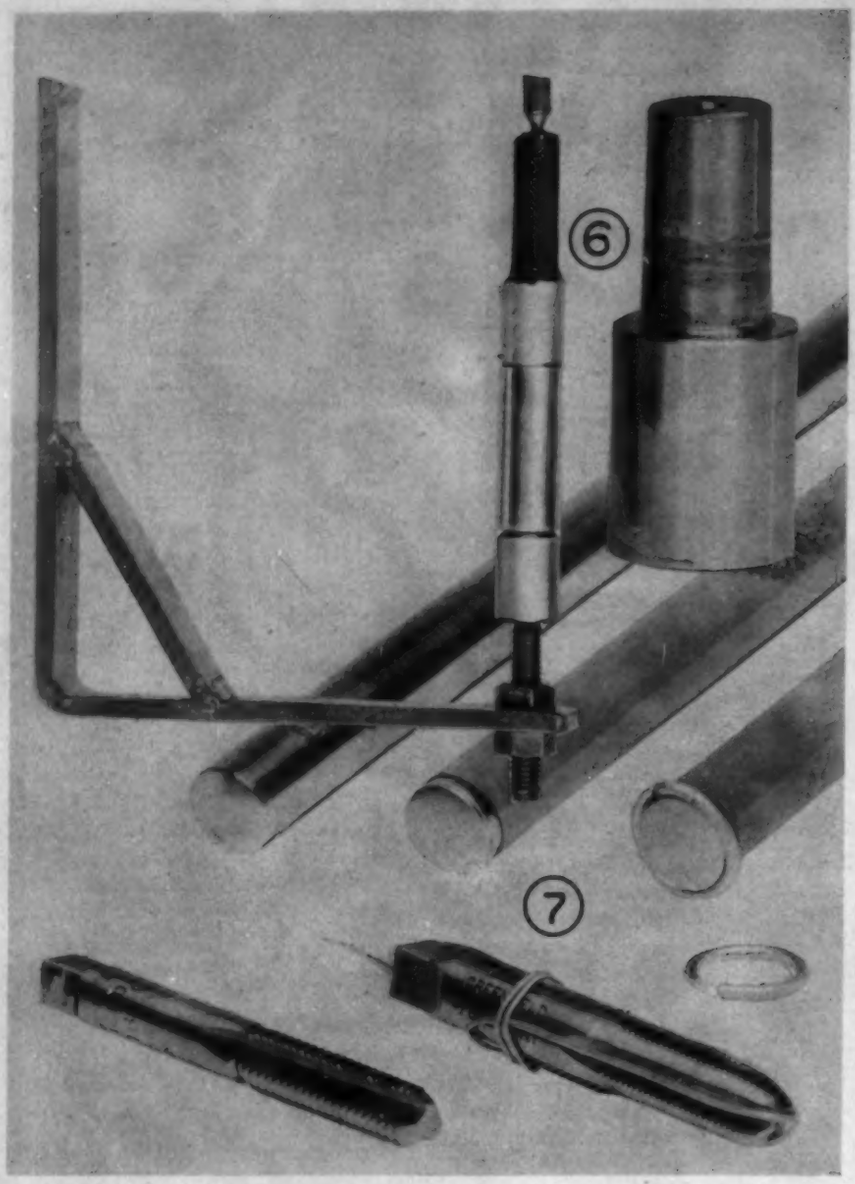



*Fig. 6—Support and "thieves" for plug gage*

*Fig. 7—Chromium plated pin standards and taps with "thieves"*

erator's past experience and his knowledge of actual plating principles.

After the gage is properly racked and "thieved", it is dipped in a paint made especially to resist the action of the chromium plating solution. Several paints have been developed in the trade for this purpose and have been found to be satisfactory. Two or three well dried coats have been found sufficient for this type of plating. The paint then is cut and peeled from all surfaces on both the work and the thief which were to be plated.

The amount of the exposed area is then calculated as nearly as possible, and the part is then ready to be put through the plating process. Except for variations used from time to time for special types of work, this procedure consists of the following steps:

1—Electroclean 1 to 3 minutes with forward current.

2—Electroclean 5 to 15 seconds with reverse current.

3—Rinse.

4—Pickle 5 to 15 seconds in 20 per cent hydrochloric acid.

5—Rinse thoroughly.

6—Place in chromium plating solution in proper position with respect to anodes.

7—Apply for 30 seconds a reverse current of approximately 2.5 amperes per square inch.

8—Plate at 2.5 amperes per square inch for predetermined length of time, solution to be maintained at 55 degrees Cent.

The composition of the plating solution is the usual one for hard chromium plate. It consists of 33 ounces per gallon of anhydrous chromic acid and 0.348-ounce per gallon of $SO_4$, the sulphate radical.

More should be said about step No. 6 since the most precise thief design will not produce an even plate unless the anodes are positioned properly. Certain types of gages require specially designed anodes, such as a ring gage where it is desired to plate the inside of a circular hole. In such a case it has been found necessary to place a circular anode through the center of the hole. Otherwise little or no metal will deposit in the hole itself, due to the poor throwing power of a chromium plating solution. But with this exception, it has not yet been found necessary to make special anodes.

The best progress to date has been obtained by following this general rule: All exposed surfaces to be plated shall be approximately 3 inches from the anode area perpendicular to the surface. Care is taken not to allow any obstruction, such as a part of the rack, to come between the anodes and the work, since it would thereby tend to shield the work.

### Two Types of Anodes Used

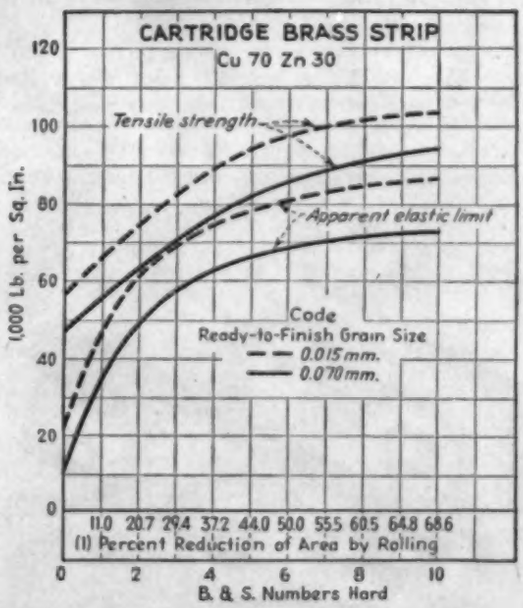
Throughout the entire period of experimentation only two types of anodes have been made. The set used when plating cylindrical surfaces is bent slightly inward so it will throw better toward the center area of the cylinder, but there has been no definite confirmation as to whether or not this produces better results. Straight anodes are used when plating flat surfaces. The diagrams, Figs. 1 and 3, will best convey the relative positions of the anode and cathode that have proved the most successful to date.

Seldom does a thief design alone produce the desired results, as could hardly be expected. On a few occasions the necessary changes are very slight, but only when the desired results had comparatively large tolerances. The usual procedure after plating a gage is to measure the plate with an electrolimit gage which is accurate to 0.00001-inch, and to note the irregularities about its surface as well as the minimum thickness of plate.

From this information it is possible to go about changing the design of the thief to produce better results, as well as to adjust the plating time to produce the desired thickness of plate. It has been found that theoretical calculations rarely lead to the correct thickness of plate, since it is impossible to predetermine the amount of metal that will be deposited on the thief. Generally, the necessary plating time to produce the desired thickness is nearly twice the theoretical value.

Although tests necessary to arrive at the proper thief design are accomplished by trial and error method, nevertheless the process can be shortened by a few

# Grain size is important in CARTRIDGE BRASS




*As shown by this chart, control of the ready-to-finish grain size is necessary if uniform physical properties are required in the finished metal.*

**Most users of cartridge brass** know that it has the most favorable combination of ductility and strength of all the brasses, that it can be readily spun, drawn, forged and upset. But many have discovered that even a metal so obliging can have a distinct "personality" of its own which has a bearing on methods of fabrication.

**For example, its mechanical properties** are markedly influenced by the ready-to-finish grain size — the crystal size obtained by the anneal before the final cold working operation. The chart shown here helps to illustrate the extent of this influence, and the effect of cold working, on the tensile strength and apparent elastic limit of cartridge brass strip, for the smallest and largest grain sizes commonly met in commercial annealing.

**This is but a single example** of the kind of information with which Revere is prepared to supply users of metals. It is one reason why persistent fabricating problems seldom trouble Revere customers. For copper-base alloys and practical help in using them, get in touch with Revere today.

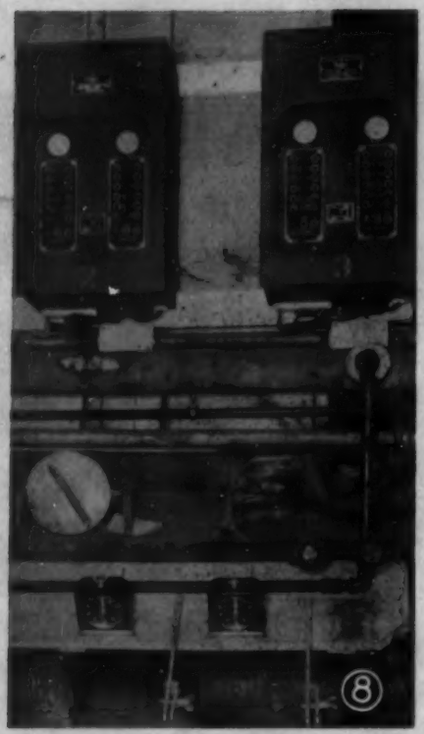
**REVERE**

**COPPER AND BRASS INCORPORATED**

*Founded by Paul Revere in 1801*

**Executive Offices: 230 Park Avenue, New York**

**Sales Offices and Distributors in Most of America's Major Cities**



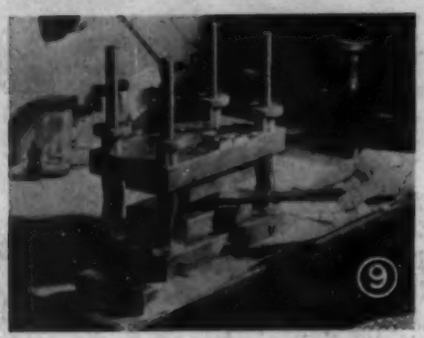


*Fig. 8—G-E Tungar rectifiers used as direct-current sources for precision plating*

*Fig. 9—Lapping a chromium-plated gage block to final gage size*

*Fig. 10—Chromium plated gage blocks and "thieves"*

calculations. Once a thief is found to produce results approximately those desired, its efficiency is nearly always found to be increased by changing the distances involved. In other words, experience has shown that more than one type of thief design can usually be employed, but that each one has optimum dimensions and distances from the work. These dimensions are varied until two different conditions are obtained, that of "over-thieving", which causes the edges and high points to receive less plate than other areas, and that of "under-thieving", which produces the opposite effect. By interpolation, the optimum dimensions and distance are usually obtained, although occasionally some minor changes have to be made.

Since the possible number of variables throughout the experimental process may change, it is best not to try to solve too many problems at once. For instance, the matter of obtaining the correct time for the desired thickness of plate is a single problem, and not too much attention should be given to it until the thief design has been settled.

To obtain correct plating time, the effect of reverse current was first studied. It was found that 30 seconds of reverse current at conditions given above removed 0.00004-inch of chromium or steel. This information was obtained by careful test and has proven itself invaluable in obtaining the even precision chromium plated deposit needed to reclaim precision gages and pin gages.

**Reclaiming Gages:** Gage blocks, when worn only a few hundred thousandths of an inch, exceed their allowable tolerance (0.000004 to 0.000005-inch). Unless they can be refinished, they are worthless. By hand-lapping methods the blocks are brought below their engraved measurement by 0.0002 to 0.0003-inch but with an absolutely even surface. The blocks are then plated above their engraved dimension by 0.0001 to 0.0002-inch with the difference between the highest and lowest spot of the plate being not more than 0.00005-inch. The gage is then hand-lapped to the proper dimension. Fig. 5 shows a drawing of one of the gage blocks and design of "thief" used in plating it.

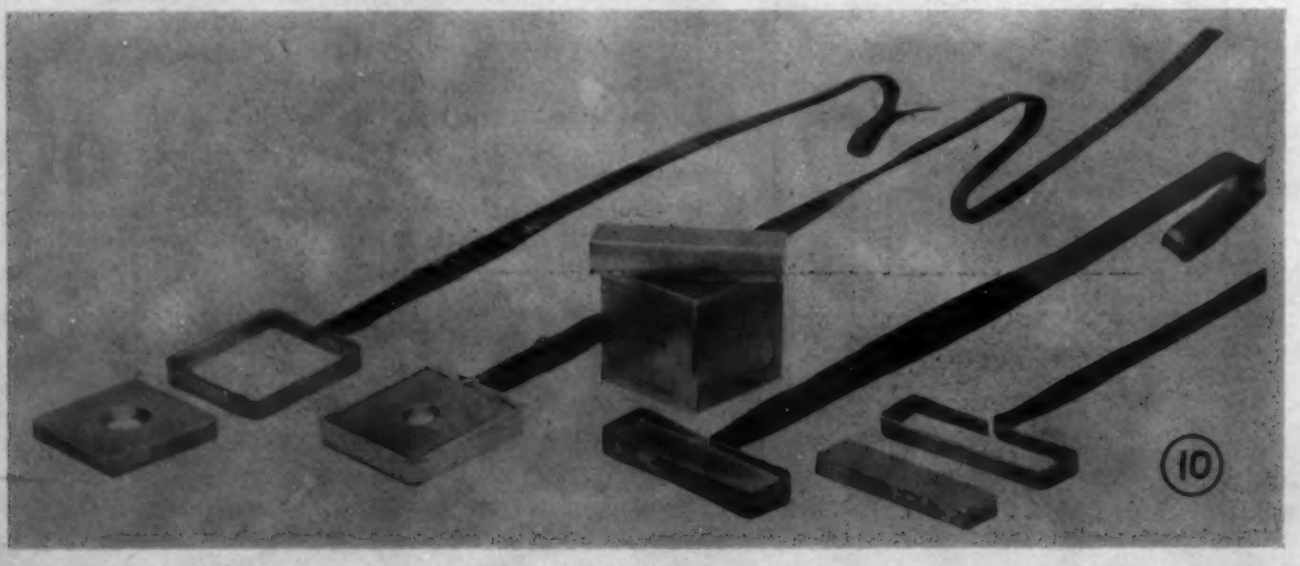
This general design of the plating rack was adopted because it offers the best means of contact to the block, as well as a thief about the edges of the surface to be plated. At first, round iron wire was used for the rack, but the edges of the block were consistently receiving more plate than the center. It was then that rectangular-shaped wire was adapted in order to obtain a closer fit to the edges of the block. This proved to produce much better results, except that the four corners still plated higher than the edges along the longer sides of the blocks. The curvature in the rack was adopted in order to eliminate this effect.

By test and interpolation of the dimensions with respect to their results, the final dimensions of the thief were decided upon. There was one more change made, however, and that was to correct the extreme edges of the block which were being slightly underplated where the opposite conditions had prevailed before.

This was accomplished by filing the edges of the rack so that they sloped in toward the face of the block as shown in *A* as compared to *B* in Fig. 5. The required time for plating 0.0002-inch on each of the two variable surfaces of the block was found to be about 20 minutes.

The resulting plate obtained by use of these thieves and racks varied not more than 0.00005-inch, which was within the desired limits.

This chromium plating process is also used for master pin gages, which are accurate to 0.0004-inch. They wear down



# Reclaim Your High Speed Steel Cutters

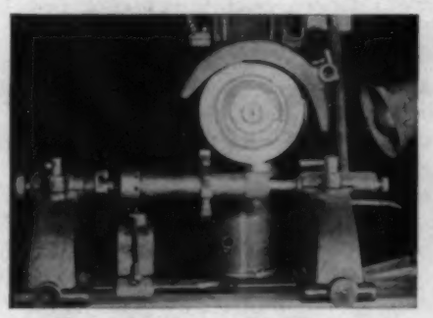
## By Brazing-on STANDARD CARBIDE BLANKS

When your high speed steel cutters are "worn out", don't scrap them. They usually can be reclaimed by simply torch-brazing standard carbide tips to the cutting edges of your cutters.

Standard styles of carbide tips are readily available to meet practically all carbide tipping requirements for all commonly used types of high speed steel cutters. With a small master stock of standard tips in your crib, you'll be prepared to reclaim and re-tool fast.

Complete instructions on request.

**THREE EASY STEPS AND YOUR OLD CUTTERS ARE RENEWED**



1 First grind a recess in the faces to which the carbide tips are to be brazed. Plan recess so that tips will project slightly over edge—for grinding back to size. Bottom of recess should be ground flat surface but not necessarily smooth.

2 Using an oxy-acetylene torch, flux, and silver solder, braze standard carbide tips in place. Process is essentially the same as regular braze for carbide tools—except braze should be completed fast to prevent oxidization and loss of chrome.

3 Grind carbide tipped "high speed steel" cutter in same way you regularly grind any carbide tipped cutter. Cutter is now ready for many times life of the original. When again worn, you can often resize using same process.

**CARBOLOY COMPANY, INC.**

*Sole makers of the Carboloy brand of cemented carbides*

11141 E. 8 MILE STREET, DETROIT, MICHIGAN

Birmingham, Ala. • Chicago • Cleveland • Los Angeles • Newark • Philadelphia • Pittsburgh • Seattle

*Canadian Distributor:* Canadian General Electric Co., Ltd., Toronto, Canada

√ Brazing literature sent on request.

**CARBOLOY** CEMENTED CARBIDES

TRADEMARK

TOOLS • DIES • DRESSERS • MASONRY DRILLS • WEAR RESISTANT PARTS

upon the ends when used and are machined until the correct curvature on the ends is obtained. This process generally leaves the pin from 0.0010 to 0.0020-inch short. Each end of the pin must be plated with approximately the same thickness so that the new length will be a few tenths over the inscribed length, allowing for finishing by polishing.

It is very important that the build-up of the plating be uniform on the ends of the pin, and that there be no treeing effect on these areas. Fig. 4 shows a drawing of a master pingage and thief design used in plating the two ends of this device.

All of the pin gages were painted with "stop-off" paint and then plated, one end at a time. The paint was cut and peeled off of the end to be plated for a distance of 1/16-inch back from the end to allow a contact for the thief.

The iron ring thief has been the only design tried so far, but it has served the purpose of near perfection. It has been found that each end of the pin, together with its thief, requires 2 amperes, and that 10 minutes will plate on 0.001-inch of metal.

More than one pin may be plated at a time in one circuit. We have designed racks capable of holding four pins. Since the rack holds the pins in solution in an angle of approximately 45 degrees, the ends to be plated are placed in a position in regard to the anodes so that they will be plated properly. For this reason the anodes have been made as shown in Fig. 2.

The results have been excellent with regard to the desired specifications, but the tolerance allowed for this type of gage was comparatively greater than for the others.

**Summary:** By the process described, worn or undersize gage blocks can be repaired by chromium plating and lapping the surface down to the proper thickness; a grinding operation being unnecessary.

It has also been shown that measuring pin gages, plug gages, and taps can be repaired by using a somewhat similar technique. *All devices repaired by this method last from three to five times as long as new unplated ones due to exceptional wear resistance of the chromium deposit.*

This investigation has shown that the two most important factors for success in this work are the proper design of the "thieves" and the accurate control of the current density. A separate current control for each device or group of devices is highly desirable.

## VIBRATING TABLE SAVES HAND WORK

**VIBRATED mechanically, table above enables two women at Westinghouse Lamp Division, Belleville, N. J., to inspect metal bases for incandescent lamps 400 per cent faster than by former methods. The new machine eliminates picking up each lamp base to check both sides for flaws. Bases are turned over automatically as they jiggle down sloping table which is kept vibrating by a motor underneath. Key point of unit is the series of "turnover tubes" across its center which consists of spiral strips that turn the bases up-side-down**

## Invisible "Raincoat" Waterproofs Many Materials

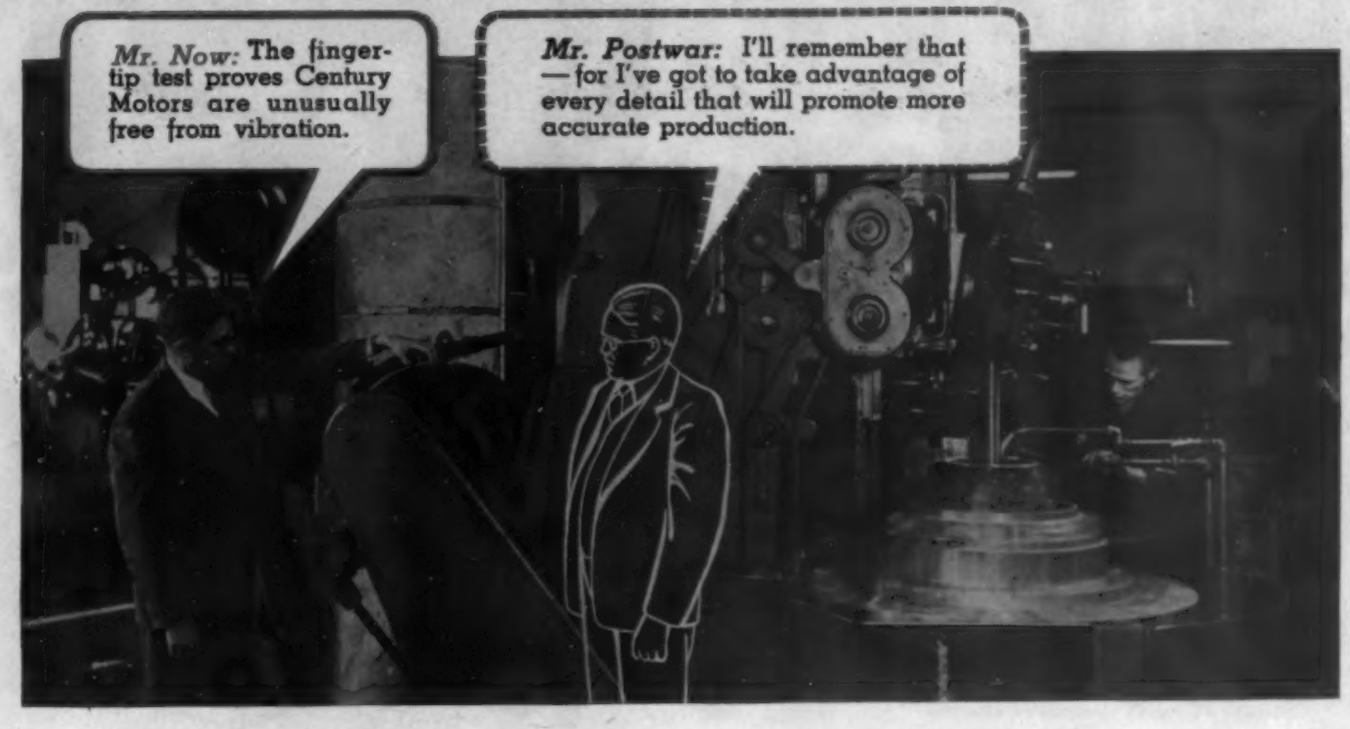
Paper, cloth and many other materials can be made water-repellent by means of an invisible "raincoat" developed recently by Dr. Winton I. Patnode of General Electric's Research laboratory at Schenectady, N. Y. The "raincoat", formed from vapors of a new compound called Dri-Film, is being used as one of its important uses for treating ceramic insulators for radio equipment. It is reported about nine times more effective than the wax used at present as a water repellent, and its results are permanent.

The compound is a clear liquid composed of various chemicals which vaporize at a temperature below 100 Cent. Articles to be treated are exposed to the vapors in a closed cabinet. Then they are taken out and, if necessary, are exposed to ammonia vapor. This neutralizes corrosive acids which may collect during treatment.

According to Dr. Patnode, the "raincoat" is so thin that its structure cannot be determined by chemical analysis. It cannot be seen under a high-powered microscope. Whatever its nature, it prevents water from spreading to form a continuous film. If moisture does collect, it is in the form of small isolated drops.

Dri-Film, after application, is not adversely affected by heat up to 300 Cent. applied for short intervals. It is not susceptible to abrasion as the result of handling during assembly of apparatus or field maintenance. Finger prints and other dirt smudges can be easily removed from Dri-Film treated ceramics with a cloth or brush moistened with solvent, the inventor reveals.

# Take a Look at TOMORROW—*Today!*


*Mr. Now:* The finger-tip test proves Century Motors are unusually free from vibration.
*Mr. Postwar:* I'll remember that—for I've got to take advantage of every detail that will promote more accurate production.

# CENTURY MOTORS'

## Unusual Freedom From Vibration Helps Machine Tool Accuracy

Century Form J Motor

On today's production front, Century Motors' unusual freedom from vibration is recognized as being of vital importance where quietness, accuracy, and precision work are all-essential.

Not only the rotational balance of Century Motors, but their design—which includes magnetic proportions, end-bumpers, rugged frames, extreme rigidity, and accurately machined feet—contribute to this extremely valuable feature. You can easily test it by placing your finger-tips on a running motor!

Out of the demands of Wartime production, where so often tolerances must be held to the closest limits, are being developed even *finer* Century Motors. It will pay you to remember Century in your present and postwar planning.

**CENTURY ELECTRIC CO.** 1806 Pine Street, St. Louis, Mo.

*Offices and Stock Points in Principal Cities*

Century MOTORS

***Century Motors are available in a wide variety of types from 1/6 to 600 horsepower.***

323

***One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World***

# SLEEVEBRICK and NOZZLE PROBLEMS

By F. F. FRANKLIN
*Chief Metallurgist*
Ingersoll Steel & Disc Division
Borg-Warner Corp.
Chicago

*Fig. 1—Used ladle nozzle with channel cut through wall by oxygen lance*

SATISFACTORY sleevebrick and nozzles are prime requisites for good pouring practice and for the production of fine quality steel. When these refractories are of an unsatisfactory nature, pouring may be defective, or bits of refractory may be found as nonmetallic inclusions in the steel. Either the pouring or the inclusions present may be sufficiently detrimental to prevent application of the steel to a given order.

Sleevebrick have a single duty to perform and that is to protect the stopper-rod. If they do this, they are usually deemed satisfactory. If the sleevebricks fail to protect the rod, it will quickly burn off and result in a running stopper, and the craneman usually will finish pouring the heat.

Besides grave safety hazards, running stoppers may cause excessive splashes, unfilled hot tops, seal leaks and stool leaks. These in turn may result in dirty and unsound steel, and in bad surface on billets or blooms.

Unsatisfactory nozzles, on the other hand, may cause leaky pouring, or may result in excessive amounts of nonmetallic inclusions being found in the steel. Leaky pours may include anything from a light drip to a full running stopper. In one case observed, use of nozzles from one shipment gave a pouring practice of 98 to 99 per cent clean poured ingots. With use of part of the next shipment, clean poured ingots dropped to 50 per cent.

Nozzles which are soft burned, or in which the fusion point is too low, result in dirty steel. They produce nonmetallic inclusions of the type shown in Fig. 3. These inclusions consist of a viscous silicate glass, or of crystals of aluminum oxide or aluminum silicate embedded in glass.

Mullite, the form of aluminum silicate, appears as elongated crystals having characteristic indices of refraction, parallel extinction and positive elongation in polarized light. The aluminum oxide forms small, optically active crystals of high index of refraction.

### Color and Indices Vary

The glass phase varies from colorless to light green or brown, and the indices of refraction range from 1.58 to 1.64.

Particles of this type reduce the machinability of the steel in which they occur, by causing excessive wearing of cutting tools, or even by nicking them. In cutting one standard type of gear from a heat of steel containing large numbers of these inclusions, the yield dropped from an average of over 400 gears per tool grind to less than 200.

This is not to mean that all inclusions in steel are of refractory origin, or that all refractory inclusions come from nozzles. Runners and the fire clay used in packing nozzles in ladle bottoms also contribute refractory type inclusions; while deoxidation products and the rarer entrapped furnace slag also contribute inclusions to steel.

The problem before refractory manufacturers, is the production of refractories which will stand up under service, and which in no way will affect the steel in a manner detrimental to its quality.

Production of sleevebrick and nozzles are similar in many respects. Both are made by the stiff mud process; and both have been made from plastic clay, or combinations of plastic and grog, plastic and flint clay or plastic, grog and flint.

Clays are ground separately in a dry-pan, and screened by means of a vibrating screen. Sizing depends upon the thermal characteristics of the clay and upon the physical structure desired in the body after firing. The clays are premixed dry. Proportioning may be done by hand, but mechanical proportioning is preferable. Water is added in the pug mill where final mixing is done.

The body is de-aired and extruded, the extrusion apparatus usually being connected directly to the pug mill. The extruded blanks differ in form among the various producers. One producer extrudes the blanks with the center-hole or bore in it and with close tolerances. This permits finishing the piece with the least amount of further deformation. In other cases the de-aired blank is placed upon a spinner-press and all the machining done there. Fig. 2 shows a blank in a spinner-press. The spinner-press shapes the snout and seat of the nozzle, and the male and female joints of sleevebrick. If

Thirty-five foot high "Karbate" absorption tower equipped with graphite trays and bubble caps. One of many examples of the application of these materials.

# Unique

## *in Properties and Performance*

## NATIONAL AND KARBATE
TRADE-MARK TRADE-MARK

## CARBON AND GRAPHITE PRODUCTS

**are being used successfully in a wide range of important applications in the mechanical, electrical and process industries because of the many advantages offered by their unique combination of physical and chemical properties.**

- Resistance to severe thermal shock.
- No deformation at high temperatures.
- Not wet by molten metals — no sticking.
- Mechanical strength maintained at high temperatures.
- No reaction with most acids, alkalies and solvents.
- Low thermal expansion.
- High rate of heat transfer (Graphite and Graphite Base "Karbate" products).
- Low rate of heat transfer (Carbon and Carbon Base "Karbate" products).
- Good electrical conductivity.
- Self-lubricating.
- Available in impervious grades.
- Available in highly permeable (Porous Carbon and Graphite) grades.
- Easily and accurately machined and fabricated.
- Molded and extruded in special shapes when quantity justifies.

---

**Carbon and graphite materials are available in the form of:**

**Brick, Blocks, Beams, Plates, Flat or Hollow Tile, Slabs, Pipe, Tubes, Rods, Cylinders, Cement, Paste.**

**A variety of sizes permits fabrication of all types of equipment from small intricate parts to huge all-carbon structures.**

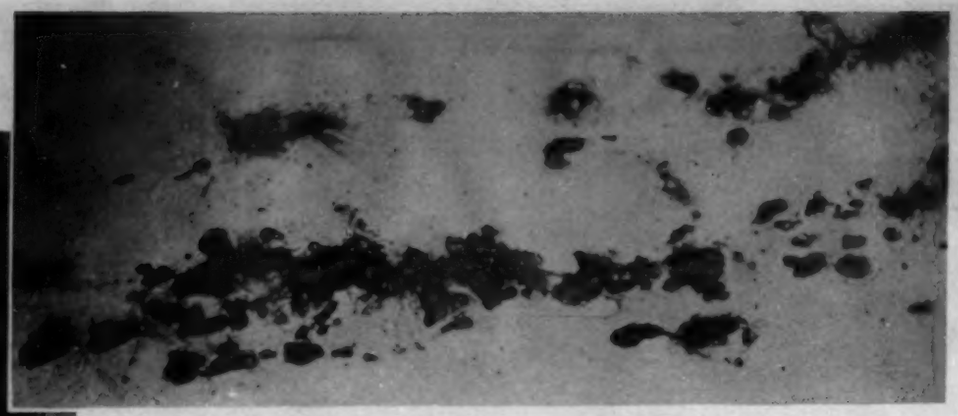
•

**Conventional design has been improved and simplified new design made possible by the use of "National" and "Karbate" carbon and graphite products. Following are some of the more important applications:**

**Heat Exchangers . . . Towers and Tower Equipment . . . Raschig Rings and other Tower Packings . . . Pipe, Valves and Fittings . . . Tanks, Tank Linings and Miscellaneous Containers . . . Filter and Diffuser Elements . . . Packing, Piston and Seal Rings . . . Bearings . . . Molds, Mold Plugs, Inserts and Stools . . . Ground Anodes . . . Welding Electrodes, Rods, Plates and Paste . . . Brushes and Contacts . . . Miscellaneous Electrical and Chemical Specialties.**

**NATIONAL CARBON COMPANY, INC.**
Unit of Union Carbide and Carbon Corporation
UCC
CARBON SALES DIVISION, CLEVELAND, OHIO
General Offices: 30 East 42nd St., New York, N. Y.
Branch Sales Offices: New York, Pittsburgh, Chicago, St. Louis, San Francisco

*Fig. 3. (Right)—Refractory type inclusion in steel. Fig. 2. (Below)—Machining a sleevebrick in a Carroll Clay Co. spinner press*



the blank does not already contain the bore, it is also made here.

The pieces are dried in air at a temperature of about 130 degrees Fahr. Maximum moisture content for pieces burned in tunnel kilns should be under 1½ per cent, but where downdraft periodic kilns are used the moisture may be higher.

Sleeves and nozzles may be burned either in tunnel kilns or in coal-fired, downdraft periodic kilns. In the periodic kiln, nozzles and sleevebrick are burned together. The sleevebrick are set four to six courses high, with joints nested. Since nozzles must be burned at higher temperatures than sleevebrick, they are placed above them, where the temperature may be 50 to 100 degrees Fahr. higher. In a tunnel kiln, the temperature control is more accurate. Sleevebrick and nozzles are burned separately. In any case temperature and burning conditions must be adjusted to give satisfactory oxidation of the body as well as a satisfactory bond.

Sleevebrick may be shipped directly from the kiln. Nozzle seats are ground after burning to insure proper seating of the stopperhead.

The first step in producing a refractory which will be satisfactory for sleevebrick or nozzles is the selection of materials to be used. If the fusion point of a nozzle is too high, the stopperhead will not seat properly, the nozzle will skull up and it will have to be burned out. If the fusion point is too low, the nozzle will wash out readily.

Fig. 1 shows one result of using a nozzle with too high a fusion point. The fusion point was 2990 degrees Fahr. The nozzle was in the secondary ladle. During the pour, it skulled up and was gassed out several times with oxygen. Finally the steel pourer decided to give it a good cleaning out. He prolonged the gassing with the result that a channel was burned clear through the nozzle wall as shown in the illustration. From this point on, the secondary ladle had to be abandoned and the remainder of the heat was straight-poured.

In production of forging grades of steel, the fusion point of the nozzle body should never be below 2600 degrees Fahr. If nozzles are used with P.C.E. (pyrometric cone equivalent) under 2600, the probability of finding refractory inclusions in the steel will be high.

Best consistent results have been obtained with nozzle bodies having fusion points between 2600 and 2800 degrees Fahr.

### Same Clay Body Used

Sleevebrick sometimes are made of the same clay body as nozzles. They should be of higher fusion point, but less dense than nozzles. For safety, the P.C.E. of sleevebrick should not be under 2800 degrees Fahr.

Grinding, mixing, de-airing and burning are all closely related in regulation of the physical structure of the finished product. Mixing should be thorough to insure uniformity. Sizing and burning depend upon the thermal characteristics of the clays.

In steel production the nozzle and stopper-rod assembly, as well as the ladle, should be heated before tap, but often no more heat is applied than that necessary to dry the clay packed around the nozzle. Sleevebricks must undergo the tremendous thermal shock of having molten metal rise around them during tap.

In addition to this thermal shock, heat is transmitted to the sleeve both from the outside and from the inside, or bore. Examination of samples from a used stopper-rod assembly will show that heat penetration is gradually deeper into the sleeve from top to bottom. In other words, the depth of heat penetration is more or less proportional to the length of time of immersion in the metal and slag. This effect is readily seen with the naked eye when sleevebricks are fractured longitudinally.

Thermal treatment from the rod becomes apparent about one-fourth of the way down. It also penetrates deeper into the sleeve towards the bottom, until the affected zone from the outside meets that from the inside, and the entire brick is affected. In the case of 150-ton ladles, this point is usually 2 or 3 feet above the stopperhead.

Because of the suddenness and the intensity of this treatment, each particle in the sleevebrick must have sufficient room for expansion, and a fairly open body, therefore, is needed. The apparent porosities of commercial sleevebricks range from 15 to 25 per cent, but best results are obtained within the range of 17 to 20 per cent.

Certain fluid, basic slags will attack sleevebrick. The attack may be prevented by throwing a few shovels of fire clay or sand around the rod before the ladle is pulled. This acidifies the slag in the immediate vicinity of the rod to a composition which will not react with fire clay. Burnt lime also may be used. In this case the slag is thickened and is rendered almost inactive.

### Must Be Hard Burned

Nozzles must withstand abrasion as well as thermal shock; and consequently must be harder burned than sleevebrick. Particles of fire clay washed out by the steel have but one place to go and that is into the ingot. If the particle is sufficiently large, and if the steel is fluid enough, it may rise before the ingot freezes and become part of the ingot scum. A nozzle with a 2-inch bore, 10 inches long, and cutting out to a 3-inch bore during the pour will lose about 40 cubic inches of clay. This would be sufficient to form 400,000 inclusions of the type and approximate dimensions of that in Fig. 3. All of these would not rise into the ingot scum or hot top.

Soft-burned nozzles do not have the necessary resistance to abrasion. Nozzles burned too hard will crack on heating.

# Did you forget to tell him what to do now?

● It's a fire-fighting axiom that the first 60 seconds of a fire are the most important. If something goes wrong then, you may have a real blaze on your hands.

Alert management, recognizing this, carefully trains its employees to fight fire. It picks key men in the plant, teaches them how different fires behave, how various extinguishers must be handled.

Authorities agree that *demonstrations* provide the best training. So Walter Kidde & Company has prepared a booklet—"How to Teach Fire-Fighting." It tells how to stage a fast-moving, interesting, instructive fire-class. Write for your plant's copy.

**Walter Kidde & Company, Inc.**
**432 West Street** **Bloomfield, N. J.**

**Kidde**
HIGH PRESSURE GASES · FIRE PROTECTION
PROTECTS LIVES

Commercial nozzles have apparent porosities ranging from 8 to 20 per cent. In production of forging grades of steel, the best results are obtained, so far as pouring practice and quality of the product are concerned, with nozzles having 12 to 14 per cent porosity. In this case porosity is used as a measure of the development of the bond. The higher the temperature at which the refractory is burned, the more vitreous phase is produced. It is this vitreous phase which cements the other particles together. Hence, in this case, a "hard-burned" nozzle will have a better developed bond than a "soft-burned" nozzle of the same composition.

The point where especially designed nozzles and sleevebrick are most needed are in the production of high manganese steels. The severe fluxing of clay refractories in production of these steels is not due to the manganese itself, but to the manganese oxide which is also present. Manganese oxide is an excellent flux for fire clay, reducing its melting point as low as 2100 degrees Fahr. In using fire clay refractories in producing high manganese steels, they should be of high fusion point, and as hard burned as is possible to use with regard to other factors, such as cracking and spalling.

The ability of sleevebrick and nozzles to give satisfactory service depends upon the materials used, their sizing, mixing and burning.

Best results in service have been given by sleevebrick and nozzles currently on the market with the following properties:

| Refractory product | Porosity, per cent | Fusion point, degrees Fahr. |
|---|---|---|
| Sleevebrick | 17-20 | 2800-3000 |
| Nozzles | 12-14 | 2600-2800 |

Development of these refractories is most needed in production of high manganese steels.

## New Compound Keeps Plastic Glasses Clear

Plexi-Glyst, an industrial compound created to safeguard visibility of plastic glasses on warplanes is announced by Turco Products Inc., Chicago. It emulsifies grease and engine spatter and cleans all plastic glass.

Safe on paint and hands, the compound is free-rinsing and leaves the plastic surface clear and free of greasy film, according to the company.

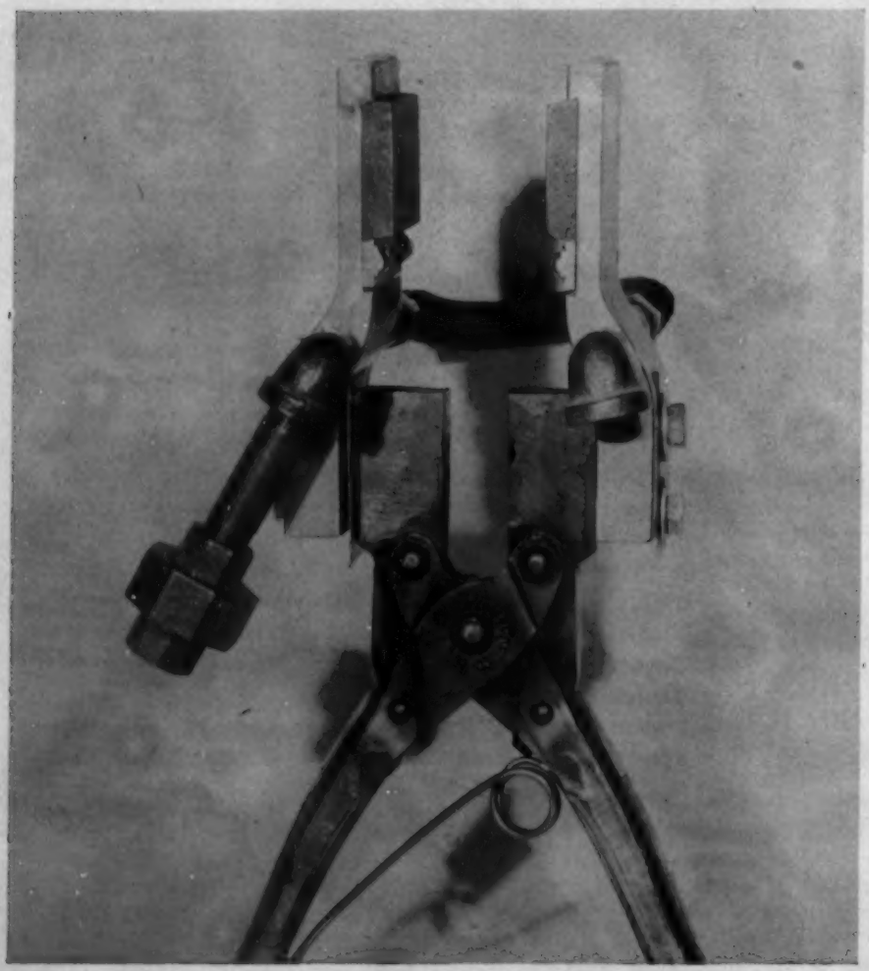
## Standards Publication Revised Completely

Release of a new publication "Electric Arc Welding Machine and Electrode Standards", publication No. 42-81, superseding No. 36-37 issued in 1936 is announced by National Electric Mfg. Association, New York. It constitutes a complete revision, the new material covering standards for both direct and alternating-current arc welders. Standards for rectifier arc welder equipment remain much the same.

Changes and additions to the direct-current welded section cover: Service conditions; motor starting and generator control equipment; current ratings and current adjustments of multiple operator welding circuit control panels and resistors and reactors for use with these panels.

Changes or additions to the alternating-current welder section include: Temperature rise; range of operation; current adjustment; short circuit current; control apparatus; panels; terminals; housing and dielectric tests.

## FROM PLIERS TO BRAZING TONGS



What happens when a pair of pliers go to war? Illustrated, left, is one answer. It represents a pair of water-cooled tongs built up from a pair of 8-inch parallel flat nose pliers to meet production requirements with silver brazing. The tongs are used as carbon holders in the incandescent carbon process of brazing, and are cool, light and efficient. According to General Electric's Schenectady Works, where it was developed, the tongs are easy to make. Here's how:

Steel blocks are first welded to the plier jaws to give them an outside width of 1½ inches when closed. The blocks then are drilled and tapped for ⅜-inch bolts. Bar copper of varying dimensions is bent to fit clearances required for the job to be handled, and the tips are cut to hold small blocks of carbon. Bars are drilled and tapped to accommodate ¼-inch pipe fittings by means of which water-cooled power leads are attached. A rubber hose jumper forms a water connection between the jaws, and additional water carriers may be drilled the entire length of the bars if necessary. Mica sheets and bushings are used for insulation between parts and pliers.

A single-loop pronged spring of 0.091-inch wire, welded at one end and free at the other between the handles of the pliers, provides sufficient force to open the jaws when the braze is completed.

# HIGH PRECISION

## *for High-Speed War Production*

High precision is the key to high speed war production—for mass production is based on a degree of accuracy that assures the perfect interchangeability of parts and units.

In hundreds of war production plants, South Bend Lathes are preferred because their high precision makes it easier to maintain exacting tolerances on important toolroom and production operations.

Modern in design, built to the highest standards of workmanship, South Bend Lathes are capable of performing finish turning and boring operations with such accuracy that subsequent grinding, honing, or lapping operations can often be eliminated. A wide range of spindle speeds permits taking full advantage of carbide or diamond tipped tools.

Convenient controls make for an ease of operation which reduces fatigue and lessens the possibility of error. Requiring a minimum of effort to run, South Bend Lathes are especially desirable where women lathe operators are employed. Write for your copy of Catalog 100C which describes South Bend Engine Lathes, Toolroom Lathes and Turret Lathes.

*Buy War Bonds!*

**"HOW TO RUN A LATHE"**

A practical operator's handbook for apprentice training that covers the fundamentals of lathe operation. It contains 128 pages, 5⅛" x 8", and over 365 illustrations. Price 25c per copy. Sample copies free to shop superintendents and apprentice supervisors.

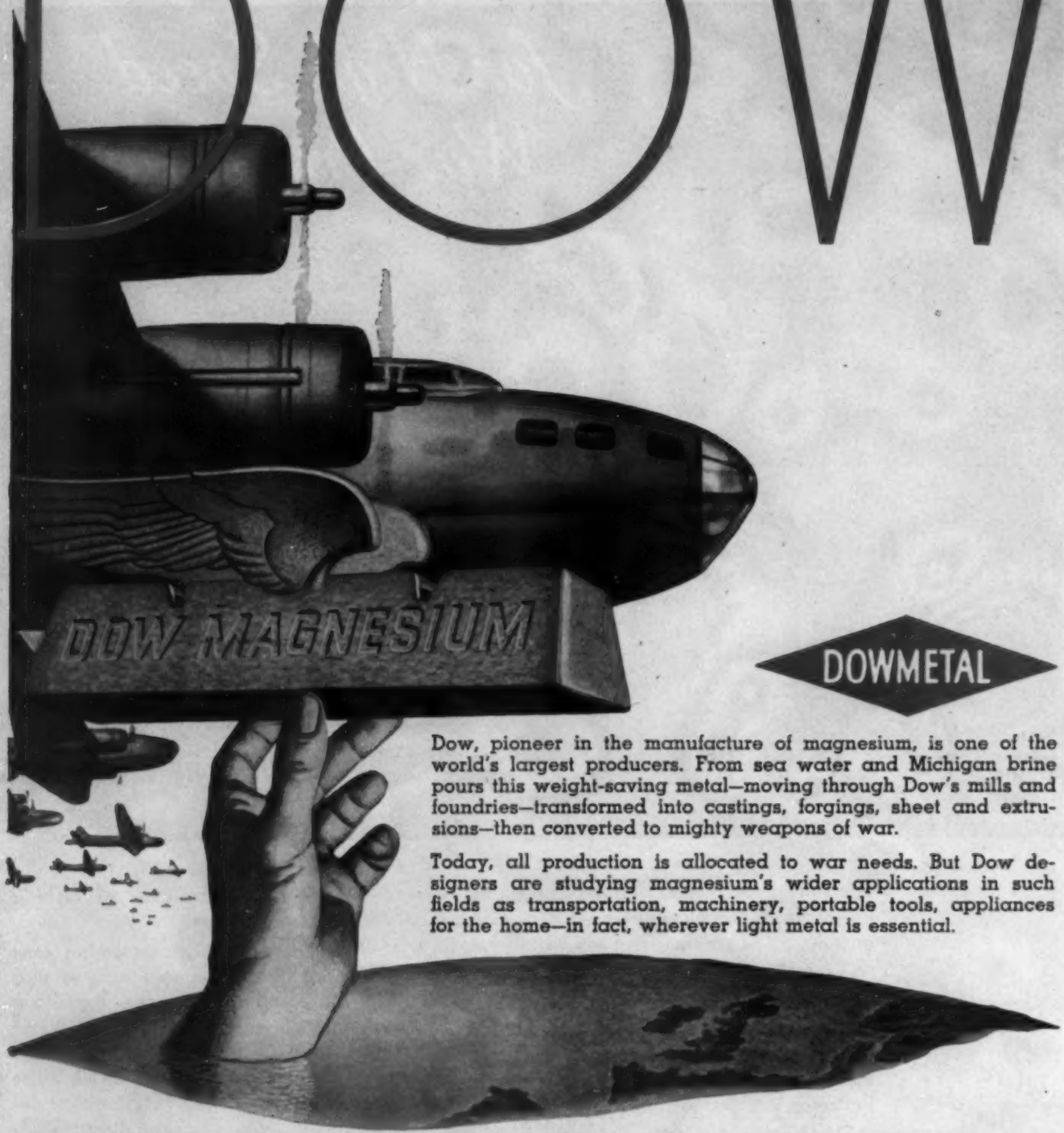
ARMY E NAVY

SOUTH BEND

## SOUTH BEND LATHE WORKS

SOUTH BEND, INDIANA • LATHE BUILDERS FOR 36 YEARS

# DOW




DOWMETAL

Dow, pioneer in the manufacture of magnesium, is one of the world's largest producers. From sea water and Michigan brine pours this weight-saving metal—moving through Dow's mills and foundries—transformed into castings, forgings, sheet and extrusions—then converted to mighty weapons of war.

Today, all production is allocated to war needs. But Dow designers are studying magnesium's wider applications in such fields as transportation, machinery, portable tools, appliances for the home—in fact, wherever light metal is essential.

THE DOW CHEMICAL COMPANY, MIDLAND, MICHIGAN

# MAGNESIUM

PRODUCER SINCE 1916

INGOT • CASTINGS • FORGINGS • SHEET • STRIP • PLATE • EXTRUSIONS

*Students in the inspection course study the important rockwell hardness tester—hardness tests being performed at many points from receiving through heat treatment and fabrication. All photos from Curtiss-Wright Corp.*

By H. C. HERRICK
Airplane Division
Curtiss-Wright Corp.
Buffalo

WITHOUT WARPLANES in sufficient quantity and of sufficient quality, we could not hope to overcome our adversaries in this war with the exacting demands on mechanical fighting equipment.

Without women workers in our war production plants we would be seriously handicapped for in this war there is not only a *fighting front* but also a *production front*. Truly, women workers can and are making a great contribution toward winning the war on the production front. This is nowhere more in evidence than in the aircraft industry, where already a large portion of the workers are women.

Curtiss is paying the highest tribute to women by placing them in responsible production jobs. This does not mean supervision responsibility in all cases. It does mean that women are being assigned such work as soldering electrical equipment, which is difficult to inspect 100 per cent. Here the fine workmanship developed in the home in such projects as knitting and crocheting come to the front, and latent qualities in mechanical senses such as are used only once in a while to repair the washing machine or vacuum cleaner are proving valuable to the aircraft manufacturer. More and more actual labor is being taken out of production through the development of machines which do the work while the operator, after setting up the machine, controls the quantity of production.

Let us consider at this time the American woman's position in this war effort in light of circumstances in other countries. First, United States, while having 130,000,000 population, is faced not only with the problem of developing and training the most highly mechanized and efficient army in the world, but also is endowed with the responsibility of remaining the arsenal for democracy in order to supply war materials of all kinds to the rest of the United Nations.

Peace-loving Americans have engaged education in further business activity, while youths in the Axis countries have been drilled and trained in the arts of war for the past five years and longer. Accordingly, we have opposing us far superior armies in quantity, and the transition from production of peacetime commodities to articles of war has not created the readjustment of lives and homes in the Axis countries that it has in the United States.

Free education and freedom of the press have given us a world-wide viewpoint and general knowledge which is found nowhere in any other country in the world. These high standards must be turned to an all-out war effort. Obvi-

*Upper view—In the inspection course, class work is coupled with actual use of gages. Here tolerances and the reason for the amount of plus and minus, the go and no-go clearances, are explained to students. Blueprint reading and visual inspection are also covered*

*Lower view—Women wear safety uniforms designed to prevent loose clothing and hair from entangling in work. Here women students are learning primary bench assembly operations, such as installing fuse fixtures and binding posts in electric boxes*

ously the old business-as-usual attitude is out. It is being replaced by a determination to win and the knowledge that *time* is the No. 1 shortage. This applies to education as well as production.

It was not so long ago that the vocational high schools and colleges were furnishing the American manufacturer with all of the skilled labor he needed. When our huge war production program was started in 1940, both plant area and employment took a 400 per cent leap, and our vocational institutions found themselves not with the problem of how to obtain positions for their graduates but how they could graduate their students fast enough to supply the demand. True, there still is a certain amount of unskilled labor available, but modern production methods require education.

So it was that Curtiss-Wright found it necessary to brief the courses then being taught and create a school in which men and women could be trained for particular jobs in from 4 to 6 weeks. During the first year this school was operated, no women were trained. Now this condition has been reversed by the demands of the armed forces and the transfer of experienced manpower to new sources of production.

Encouraging evidence that the American public is taking this war seriously is the number of women applying for training in factory positions. The Curtiss training school, located at 638 High street, Buffalo, is under the supervision of J. F. Kolb, who supervises the training of prospective employes in all plants of the airplane division and related training centers. This training school costs the applicant nothing. C. M. Jackson directs training in Buffalo and is assisted by 21 instructors, 3 interviewers, a doctor and a nurse. The school has facilities to handle an enrollment of 400. At present, most of these are girls eager to do a job and help "Keep 'Em Flying" while their boy friends or husbands are away.

The age of the women enrolled in this school ranges from 21 to 45 years. Some 50 per cent are married. Not many have any factory experience. It is amazing to see the keen interest and satisfaction expressed on their faces when, after learning to use a riveting gun, they take the tool in their own hands and do a neat job on their first rivet.

Many women have had the impression that a factory was a dismal place where men and women worked in old clothes in dark surroundings and were happy to leave when their 8 hours of hard labor was done. They find quite the opposite at Curtiss-Wright. Here employes assemble airplanes in air-conditioned fluorescent-lighted departments. The women wear safety clothes which consist of slacks, sleeveless shirts and caps. See accompanying illustrations. Loose clothing, long sleeves and hair worn at full length spell disaster as any or all may become entangled in the machines. The women quickly grasp the resulting danger to working time and realize that lowered output cuts the pay check as well.

Applicants to the Curtiss training schools must meet the following qualifications: First, minimum age for enrollment is 18 years. Second, the applicant must show proof of American citizenship by presenting a birth certificate or final naturalization papers. Aliens cannot be enrolled. Third, graduation from any high school or equivalent vocational training school is preferred. Fourth, experience for girls is not necessary. Fifth, all applicants must submit to a physical examination. This general examination includes a check for physical defects and chronic diseases, such as tuberculosis and diabetes.

**Tools and Equipment:** The purchase of good tools is encouraged as a wise economy. School instructors advise the trainee as to the quantity and type of tools needed. The average investment at the start is about $8.50 for tools. The slacks, shirt and cap uniform required for women costs less than $5 for the complete outfit.

Upon application at the Curtiss training school, one of three interviewers discusses the applicant's particular qualifica-

## *"Tomorrow may be too late—do it today!"*...CHECK UP!

THIS

**ELECTRICAL FAILURE HALTS WAR PRODUCTION**

MIGHT HAVE PREVENTED

THIS

WARTIME restrictions make copper products hard to get — this includes electrical wire and cable. It will pay you to protect what you have.

Anaconda's Preventive Maintenance Plan will help you check to see that cables in your plant are not being abused.

If you follow this free plan you not only help yourself, but more important, you help the war effort. This manual provides a practical automatic method for complete analysis of circuits and equipment... uncovers potential weaknesses ... methods for correcting them... with charts to enable quick periodic check-ups.

**NOTE:** Through this Preventive Maintenance Plan you may uncover the evidence necessary to obtain an "emergency repair priority." This is explained fully in the plan book.

# ANACONDA'S PREVENTIVE MAINTENANCE PLAN

ANACONDA

Anaconda Wire & Cable Company
25 Broadway, New York City

Please send copy of the Anaconda Preventive Maintenance Plan for safeguarding production.

Individual .....

Company .....

Address ..... City .....

4-P

# BRAZING ROPE ENDS

## . . . . *makes wire rope safe to handle*

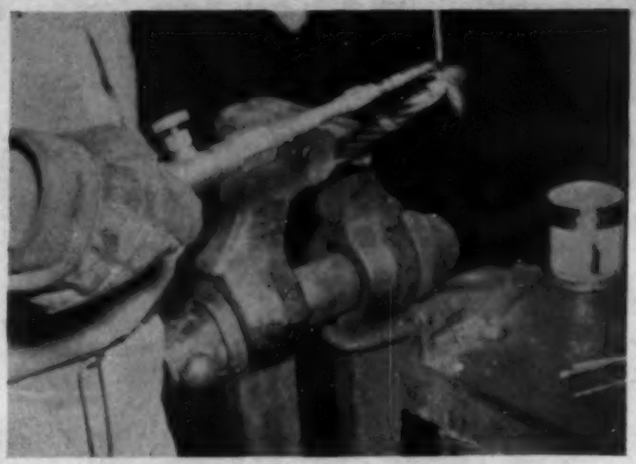
By F. L. SPANGLER

WHERE clip fastenings or other means of attachment are used that expose the end of a wire rope, there is a constant danger that those handling the rope may receive lacerations or puncture wounds from the sharp wires at the rope end. This form of injury is regarded by some medical authorities as being especially dangerous since it is likely to be deep seated, and the injured man might consider the wound as too superficial to require immediate attention. It is not uncommon for blood poisoning to develop from such wounds where immediate treatment is not given. And now that we need every ounce of production energy, this is no time to have workmen laid up because of injuries.

A simple method of eliminating the hazard of sharp exposed rope ends is to braze the end of the rope with a bronze welding rod, running the bronze back for a distance of an inch or two from the end. When properly done, the bronze then covers all the wire ends, and it also has the advantage of holding the rope end intact so that seizings can be removed.

Ends of preformed ropes can be brazed without applying a seizing beforehand, since preforming removes all unbalanced stresses in the rope wires and strands so all wires hold their position in the rope when it is cut. Even so, a single seizing will insure that the rope construction will not be flattened during the cutting operation. If the rope is not preformed, it is recommended that two or three seizings be applied—one close to the end of the rope and the others a short distance (4 to 6 inches) apart.

Where end brazing is done, either the same torch or a cutting torch may be used to sever the rope before bronze is applied to the end.



tions and finds out what line of work she is best qualified to perform. Types of work in which women have been found most proficient include aircraft riveting, sheet metal fabrication, bench assembly and fitting, airplane manufacturing inspecting. Courses of study for these positions are open to women at the Curtiss training school and last from 4 to 6 weeks.

Naturally, certain individuals learn faster than others. These are pushed ahead and admitted to the factory on an earning status as soon as they are deemed qualified by their instructors. While the Curtiss-Wright Corp. cannot guarantee a job in the factory to men and women accepted for the school or trained by it, only those with a definite lack of inherent ability have been dropped. Over 25 per cent of the total employment of the Curtiss-Wright plants in Buffalo have been graduated from the Curtiss training school.

Upon employment in the factory, women receive pay comparable to men in the same classification of work. From all walks of life they come—waitresses, store clerks, housewives and school teachers—lending their efforts to produce war planes. Women are considered vital in production of military aircraft. Their participation in what used to be heavy work is now made possible by improved machines and materials handling facilities.

Huge presses that weigh 125 tons and exert a force of more than 3000 pounds in forming parts are controlled with ease by electrically operated finger-tip controls. Slabs of steel bearing dies and parts which have been formed are then moved out from under the press by an automatic device which makes possible unloading by hand. After the press is reloaded with flat sheets called blanks, another button is pressed and the huge power-driven table slides under the press and the machine completes the forming operation.

This operation is typical of the advances that make possible the use of women in production work. In most sections of the factory, finished parts are easily handled due to their lightness—one of the important essentials of all parts for aircraft.

Everywhere in the plant, women take particular interest in producing. Some are spray painting, others are putting together subassemblies at a bench, while others handle inspections. In the electrical department, a large number of women operators solder wiring in the assembly of radio and other electrical control equipment. In the cover department, work by women is found preferable to that done by men. Here rudders, elevators and ailerons are covered by Grade A cotton envelopes, presewed on three sides. The fourth side is then hand sewed and the assembly sent on for painting.

The Curtiss training school has a total floor area in excess of 40,000 square feet. It operates as a miniature factory, and in it the trainee learns all types of factory operations by doing actual production work.

More women will be required for aircraft production in the near future as more men go to the armed forces. There is no doubt that they will answer the call.

# ZINC HAS AN ERRAND OF MERCY

★ So vital in destroying our enemies, zinc is also vital in saving lives. The Medical Corps uses zinc in nearly 100 items of essential equipment . . . operating knives, syringes, operating tables and X-ray machines are only a few. A big hospital sterilizer requires as many as six slabs of zinc. Zinc oxide is required for adhesive tape and healing ointments.

We have greatly expanded our facilities in order to supply war time requirements. Tomorrow the industries of peace will benefit by our ability to supply a more complete line of zinc metals than ever before.

EVERY GRADE OF ZINC FOR WARTIME REQUIREMENTS

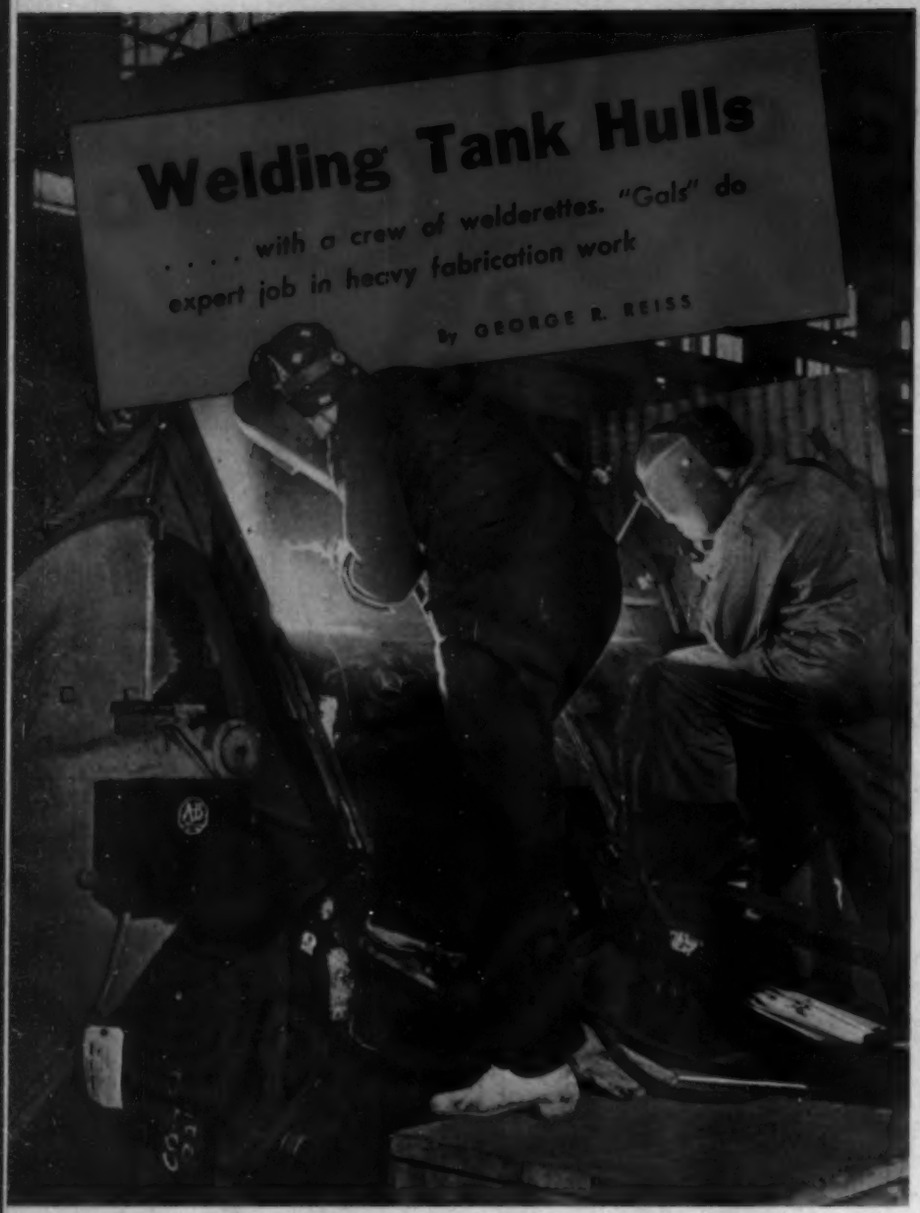
PRIME WESTERN
★
SELECT
★
BRASS SPECIAL
★
INTERMEDIATE
★
HIGH GRADE
★
SPECIAL HIGH GRADE

**AMERICAN ZINC SALES COMPANY**
Distributors for
**AMERICAN ZINC, LEAD & SMELTING CO.**
COLUMBUS, OHIO CHICAGO ST. LOUIS NEW YORK

# Welding Tank Hulls

. . . . with a crew of welderettes. "Gals" do expert job in heavy fabrication work

By GEORGE R. REISS



*Welding the front end of the hulls on a heavy duty welding positioner that permits making downhand welds by rotating the entire structure to the angle desired*

AMERICAN ingenuity is providing many of the answers in this difficult day of critical shortages and priorities. This is the story of how a war industry obtained a fine big plant and put it into production in an "impossible" stretch of time. It's the story of the General American Transportation Corp.'s Army tank hull factory in the Youngstown district.

Only about a year ago, the corporation was awarded a contract by the United States Army to build tank hulls. General American is an important maker of heavy plate products such as tank cars, gasoline and water storage tanks; pressure vessels for oil, sugar, chemical and dye industries; accumulators for steel plants; annealing cases for rolling mills and similar heavy steel fabrications. So making Army tanks was "right up its alley".

But the order was virtually an impossible one, for it stipulated that the new plant must be erected, fully equipped and in full operation within a few months. There was reason for this rush. The United Nations' fighting forces were crying for tanks. The tank hulls were to be finished in two other factories in the eastern Ohio and western Pennsylvania region. These plants would be ready by that time, but if the hull producing plant was not ready, they would be useless.

"Impossible!" cried some engineers. "You'll not be able to get the steel in that time—let alone get it up." But others felt ingenuity would find a way. . . . And it did.

General American had one little idle plant in the Youngstown district at the time, one it had acquired previously from the Petroleum Iron Works Co. But this plant was much too small. In fact, it had only about one-fourth enough space. Engineers looked over the job, made estimates on the time it would take to enlarge it to the proper size.

"Too long," replied General American executives, in despair, "much too long." For the job would have to be done in less than half that time. So they appealed to Russell R. Hetz, head of Hetz Construction Co., Warren, O., specialists in rehabilitating aged industrial plants.

### Plant Grows Quickly

And Hetz did the trick for he still had part of the old American Locomotive Co.'s locomotive-building plant at Richmond, Va., which he had subdivided several years ago. He rounded up that material, plus part of an ancient factory at Pittsburgh and part of the old American Sheet & Tin Plate Co. plant at Dover, O. While the old steel structurals from these plants resembled so much scrap, they were assembled within a few weeks at the General American's little plant in which some equipment had been set up temporarily to rework and refinish those old structurals. Then the material was tacked onto the old PIW building near the Heller-Murray Co., Youngstown industrial contracting firm.

Well within the allotted time, General American had a fine big high-roofed well-ventilated plant. You've got to look close to find that only a few months ago it was four plants, separated by hundreds of miles.

And now the plant is making in large numbers one of the most essential parts — the tough-skinned hulls — of those hard-fighting tanks, the 28-ton M4's, which are making such an effective showing on so many battle fronts. They are all-welded jobs, with curved surfaces which shed high-powered rifle bullets like rain drops and even toss off cannon fire from their steel sides without much damage. They are made of steel so tough and hard that an ordinary file won't even scratch it. They are low-cut low-hung jobs for less visibility, and they mount a revolving gun turret which permits them to fire anywhere around a complete circle.

Welding these hulls is a complicated and exacting job, requiring expert workmanship and much alloy steel welding. Nothing is left to chance. The welds are carefully inspected visually. Then two big X-ray machines photograph every foot of weld, ferreting out any cracks or other imperfections.

One of the big problems is in finding enough highly-skilled welders, for this

# SHIP, CAPTAIN AND CREW

UP IN THOSE CLOUDS enemy bombers are hunting them. Behind, an Axis submarine trails them toward the setting sun. There's a hurricane brewing. Bravely they steam along.

Providence be with this valorous gambling team—ship, captain and crew. On trips of peril they plow on, delivering the goods of war, thoughtless of self. The jobs these merchantmen perform to save democracy rank with the noblest exploits of American pioneers. We at home should do more to pay them tribute, help them win, by working harder, giving more for bonds of Victory!

• • •

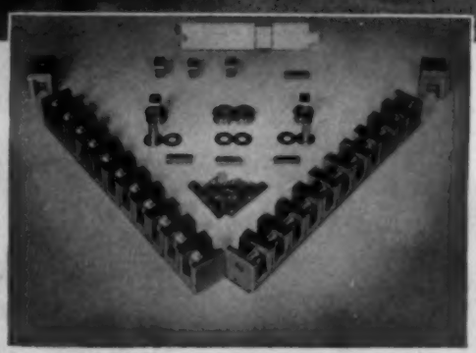
Castings for this ever-growing fleet of merchantmen are part of Continental's war production. In addition, Continental Rolls, in mills throughout America, are rolling the steel plate that goes into these ships. Thus, in war, our work at Continental is doing a job we prepared for in peace. In the manufacture of steel castings our production is among the largest in the country. Over twelve years ago Continental pioneered the High Production Rolls used today for all high-speed strip mill operation.

*CARBON AND ALLOY STEEL CASTINGS • ROLLS • ROLLING MILL EQUIPMENT • SPECIAL MACHINERY*

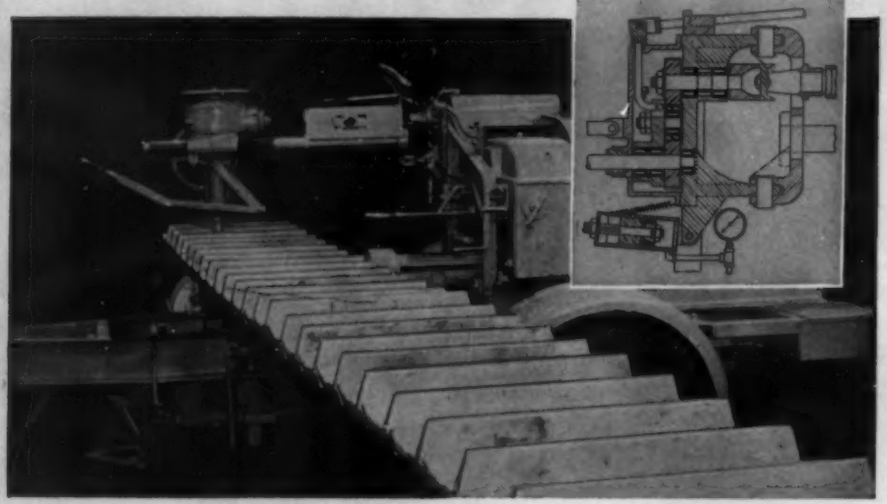
**CONTINENTAL**
**ROLL AND STEEL FOUNDRY COMPANY**
CHICAGO • PITTSBURGH

# IN THE NEWS
## WITH BANTAM BEARINGS

**SIMPLER, MORE EFFICIENT PRODUCT DESIGN AND ASSEMBLY** is often achieved by the use of special types of bearings such as these Bantam Journal Roller Bearings built for use in the crown and traveling blocks manufactured by Emsco Derrick & Equipment Co. Measuring 27½" O.D. they are provided with thrust shoulders built into outer races to eliminate hazardous thrust washers and contribute to compact design. Bantam's engineering and manufacturing facilities are geared for the prompt delivery of such special bearings for essential purposes.



**"SEWING" SHEETS OF STEEL** together rapidly with dependable welds to speed shipbuilding is the work of The Linde Air Products Company's "Unionmelt" welding machine. Special anti-friction bearings built by Bantam are used on the pressure and straightening rollers which feed the welding rod. These bearings, shown unassembled in the inset above, assure long, trouble-free service and are typical of Bantam's ability to provide bearings for special applications of all types.



**LOW STATIC FRICTION** of a Bantam Quill Bearing aids in actuating a safety-stop device on the cam-feed mechanism in this U. S. Tool Company "Multi-Miller," by allowing a normally stationary high-friction bearing on the camshaft and inside the Quill Bearing to turn when pressure on the shaft approaches the overload point.

**EXPERIENCED SKILL TO SERVE YOU** in the unbiased selection of standard bearings or in the design of bearings for unusual applications is offered by Bantam's engineers. Bantam makes every type of anti-friction bearing—straight roller, tapered roller, needle, and ball. No matter how difficult your bearing problem, TURN TO BANTAM.

**UNLOOSENING ROCK-BATTERED BOLTS** on the caterpillar tracks of tanks and tractors is the tough maintenance job performed by this track wrench, a product of Rodgers Hydraulic Incorporated. Despite the unusually heavy stresses encountered, dependable power transmission is assured by the high load capacity of eight Bantam Quill Bearings and four Bantam Needle Roller Bearings used in the gear mechanism. In addition, these bearings contribute to compact design because of their small size, as can be seen from the accompanying cross-section drawing, and to low power consumption because of efficient lubrication and low friction coefficient.


ARMY E NAVY

**BANTAM BEARINGS**

STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL

THE TORRINGTON COMPANY · BANTAM BEARINGS DIVISION

SOUTH BEND, INDIANA

*Upper left—Welderettes at General American plant do the heavy welding shown in accompanying illustrations. It only took six weeks' training to get them into production*

*Below — Welding the low-hung hulls of the 28-ton M-4 Army tanks at General American Transportation Corp.'s plant*

is no easy welding job. Welderettes (lady operators to you) are the answer. "And they're doing an excellent job, too," commented one executive.

The welderettes—ex-stenographers, ex-bookkeepers, ex-store clerks, ex-waitresses—are trained for five or six weeks in the company's own welding school, drawing pay while learning. And they come out expert welders.

After welding, the tank hulls are finished in the plants of the Federal Machine & Welder Co. and the Pressed Steel Car Co.

The tank hulls are only part of the General American Corp.'s contribution to the war effort. Its three plants are also making many important steel products to be shipped overseas under lend-lease contracts to aid our allies. These include rail tank cars, high pressure vessels for synthetic rubber manufacture, gasoline and water storage tanks.

Besides they are making tank cars for hauling gasoline and fuel oil to the East, processing vessels for the oil refineries and synthetic rubber plants, big pipe lines for blast furnaces, TNT storage tanks and other heavy plate fabrications.

## Presents Plan To Save 250,000 Pounds of Rubber

A plan to save 250,000 pounds of crude rubber this year—an amount equal to the yearly output of 25,000 rubber trees—was announced recently by Walter Geist, president, Allis-Chalmers Mfg. Co., Milwaukee. It calls for "wartime drives" using shorter center distances and larger sheaves on all new applications during 1943.

"The plan is geared to present design limitations," said Mr. Geist, "and only slight changes in dimensions are necessary to save a quarter million pounds of crude rubber."

Although engineering of individual V-belt drives in the past was governed largely by such considerations as convenience, habit and machine design, today the most important consideration is the saving of rubber, Mr. Geist pointed out. However, he added, the plan should not be regarded as a temporary, wartime expedient, for the increases are sound and practical—in line with a long-range trend to larger diameters.

By following the program, nearly every field of industry would actually contribute hundreds of pounds of rubber to the war effort. Every buyer of new V-belt drives would not only aid the war effort, but could individually save, on the average, $15 out of every $100 they spend on new drives and $35 of every $100 ordinarily spent on replacement, according to the plan.

Details of the new program and how it can be applied to representative applications are explained in the current issue of the Allis-Chalmers publication, *Texrope Topics*.

## New Coating Extends Life of Fire Brick

Life of fire brick, insulating fire brick, and castable refractories in coal, oil, gas-fired and electric furnaces, as well as in nonferrous melting furnaces, can be prolonged considerably with the application of Cromox, a protective refractory coating material developed recently by Federal Refractories Corp., unit of United States Stoneware Co., Akron, O.

The coating, which is applied by brush, spray gun or dipping, will withstand temperatures up to 3000 degrees Fahr., it is reported. It will not crack, peel, blister or bloat as it becomes an integral part of the refractory to which it is applied and expands and contracts with it. Cromox is said to resist flame erosion, reduces spalling and is unaffected by the attacks of slags, alkalies, acids and moisture.

# NEW BROACH

## Finishes Round Holes

HOLES within two ten-thousandths of an inch of being perfectly round and straight can be finished by means of a broach designed recently by Howard Fancher, a methods man at General Electric's Schenectady Works. It is being used to finish-broach the bore in gear blanks and similar parts where initial machining operation must be held to this tolerance to prevent magnification of error in subsequent machining.

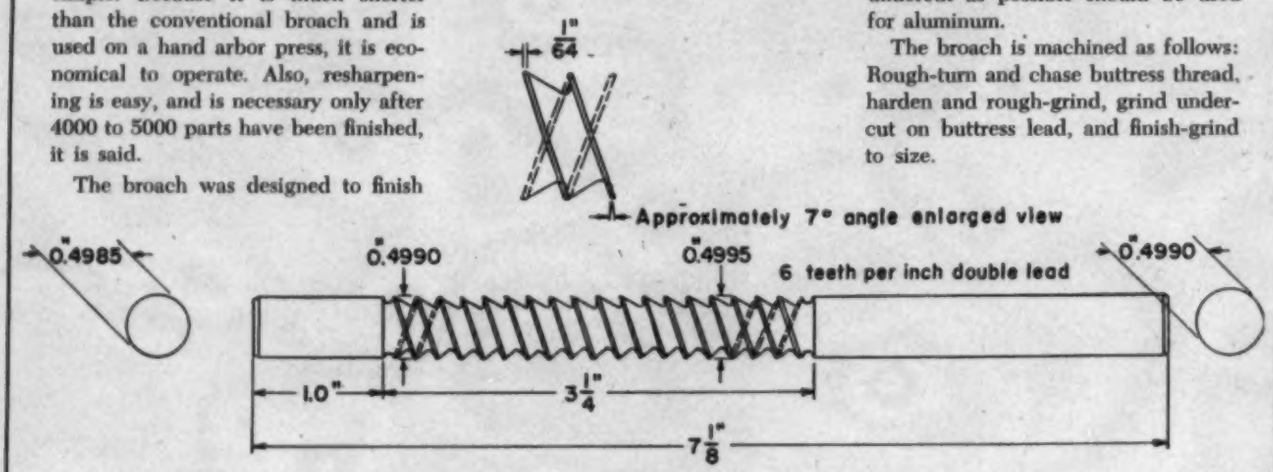
The tool is reported to overcome difficulties encountered previously due to broach contortions and such variables as contour of parts and material specifications. Its design is simple. Because it is much shorter than the conventional broach and is used on a hand arbor press, it is economical to operate. Also, resharpening is easy, and is necessary only after 4000 to 5000 parts have been finished, it is said.

The broach was designed to finish the bore with a burnishing effect to within the 0.0002-inch tolerance after it was rough-broached 0.0005 inch under size. The broach used formerly was ground to a 0.0005 inch under size to allow 0.0005-inch stock to be removed with the finishing broach.

The new broach is of High-Speed steel with a pilot 1 inch long, the diameter of the rough-broached hole, a double buttress thread approximately 3 inches long, and a shank long enough to push the buttress through the work. Diameter of the shank is same as the diameter of the finished hole. The reaming portion has a taper of 0.0004 in 2½ inches, and the last ½ inch is left the size of the finished hole. A good burnishing effect is obtained if the last ¼-inch is not backed off as much as the cutting part of the broach, it is said.

This design can be modified readily in accordance with the hole being broached and the material of the part, the company points out. The smaller the diameter of the hole, the finer the thread required. For example eight threads per inch is used for a ¼-inch diameter hole, whereas six threads per inch is used for a ½-inch diameter hole. A single thread with hardly any undercut should be used for brass, while a triple thread with as much undercut as possible should be used for aluminum.

The broach is machined as follows: Rough-turn and chase buttress thread, harden and rough-grind, grind undercut on buttress lead, and finish-grind to size.




## ASTM Issues Index to Its Book of Standards

American Society for Testing Materials, 260 South Broad street, Philadelphia, has issued an index to its standards, including tentative standards, as of December, 1942. It is an adjunct to the society's 1942 book of standards and enables any of the 1100 standard specifications and tests to be found readily. It also shows whether specifications, test methods or definitions on any material or subject have been issued.

Copies are supplied without charge on written request.

## New Glass Acid Tanks Are Shock Resisting

A line of new glass tanks for industrial or commercial applications requiring a noncorrosive, shock-resisting material is reported by Pittsburgh Plate Glass Co., Pittsburgh.

The new tanks, it is said, eliminate practically all the former difficulties, encountered by mills, factories and plants in holding acids or chemicals.

A new method of heat treating is reported to provide the tank material a physical strength four to five times greater than ordinary glass. Furthermore, the glass has a high resistance to thermal shock. It will withstand continuous operating temperatures of 650 degr[illegible] Fahr. and an instantaneous thermal sh[illegible] of 400 to 500 degrees.

## Fundamental Analysis Of Air Conditioning

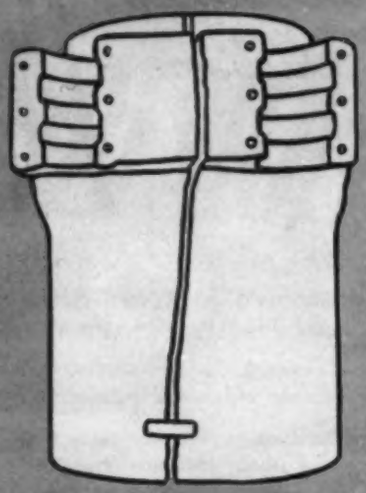
*Air Conditioning Analysis*, by William Goodman; boards, 455 pages, 6¼ x 9¼ inches; published by the Macmillan Co., 60 Fifth avenue, New York.

Assuming that most treatises on air conditioning are devoted to refrigeration, air handling and temperature control rather than the central element, changing the condition of the air, which has not had in one place a comprehensive, unified treatment of its fundamentals, this work has been prepared.

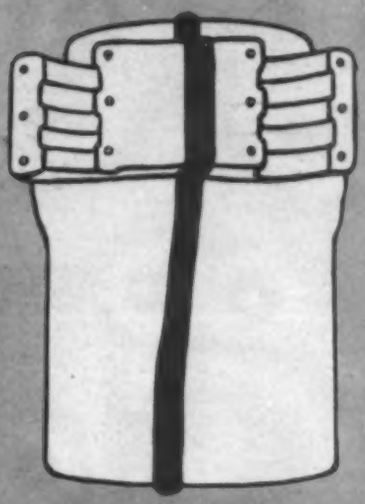
An important feature is a series of psychometric charts with co-ordinates of enthalpy (total heat) and specific humidity for a wide range of temperatures. Use of charts with such co-ordinates simplifies analysis of air conditioning processes by basic thermodynamic methods. These charts allow clear and simple visualization of air conditioning processes and allow quick graphic computations, eliminating much tedious arithmetic. Attention is given to properties of air under varying barometric pressures.

The material was developed from an elementary point of view, proceeding by intermediate steps to give grasp of the development of the topics. Mathematical derivations are given for all formulas, appearing in appendices at the end of each chapter, where they do not interfere with smooth development of subject matter.

*Broken cylinder halves aligned and prepared for welding, with flame-cut gap.*



*Completed weld and collar of Thermit steel.*



# 25 TON CYLINDER BROKEN IN TWO—RECLAIMED BY THERMIT WELDING

*Machining Finished Weld.*

THE diagram shows how a 25 ton rubber mill extrusion press cylinder that had broken in two was saved from the scrap pile by Thermit welding. Because of the shortage of casting facilities and the attendant delays in replacing such a large unit, it was decided to repair it by the Thermit process—the only practical method because of the size of the unit and the complete break. Despite the size of the weld, 5,000 pounds of Thermit weld metal were deposited in less than a minute. The entire job was completed within three weeks as against the months required for a new cylinder replacement.

After machining and testing, the finished cylinder was put in operation, working continuously 24 hours a day under its full pressure of 6,000 pounds per square inch.

Thermit welding is solving many problems of wartime industry, particularly where quick reclamation of broken parts is necessary to minimize shutdowns.

*Write for booklet—"Thermit Welding"—which describes the process in detail and how it is being utilized in the fabrication of large units.*

**METAL & THERMIT CORPORATION**

*Specialists in welding for nearly 40 years. Manufacturers of Murex Electrodes for arc welding and of Thermit for repair and fabrication of heavy parts.*

THERMIT WELDING

**120 BROADWAY, NEW YORK**

**ALBANY • CHICAGO • PITTSBURGH**

**SO. SAN FRANCISCO • TORONTO**

# Materials Handling Facilities Aid in Plant

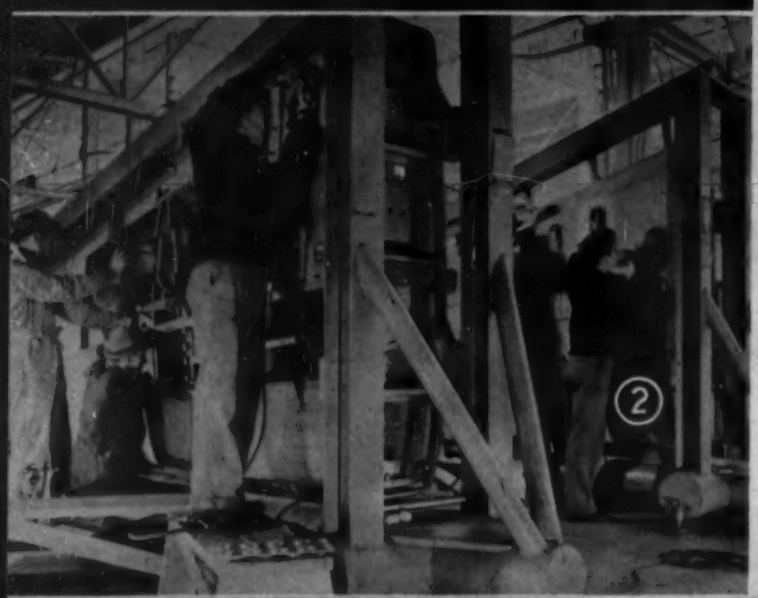


*Fig. 1—In paint spray booth, jeep bodies and truck bodies travel down the same chain conveyor*

*Fig. 2—Final assembly jigs for airplane wings employ extended use of welded tubular sections*

*Fig. 3—Overhead chain conveyor takes jeep bodies on to painting and finishing operations from the fabricating section shown here*

*Fig. 4—Special jig at right facilitates spot welding of trailer bodies for Army vehicles. Unusual device at left delivers body to next operation. After setting on end, workman merely tips it over and lets it slide down the chute*

*Fig. 5—Gas and electric welders work side by side on this line fabricating jeep bodies*

*Fig. 6—Batteries of large air, toggle and hydraulic presses make this one of the largest stamping plants in Indiana. Note steel skid platforms and skid boxes for handling parts by means of power lift trucks*

# Conversion

***In short period, plant converts to war work, handling ten times the volume of work ever before produced. Yet manufacturing facilities are increased only two to four times. New mechanical materials handling facilities account for much of improved production efficiency***

CONVERSION of one of the largest metal stamping plants in the state of Indiana from peacetime to war production began fully nine months before Pearl Harbor. Once a manufacturer of automobile bodies, light package delivery trucks, refrigerator cabinets, beverage coolers, kitchen cabinets and sinks, The American Central Mfg. Corp., Connersville, Ind., had served as a subcontractor to other manufacturers for so long that it was in a peculiarly favorable position to get into war work quickly after it began to accelerate, following the fall of France in June, 1940.

The company had emerged in April of that year from a period of reorganization necessitated by the depression. Purchase of a substantial interest in the company by The Aviation Corp. and a new management headed by Saunders P. Jones as president made it possible for the organization to compete aggressively for new subcontracting work.

As Mr. Jones put it, "We had the presses and the supervisory personnel required to handle the sheet metal operations involved. All that we had to acquire were the additional welding, riveting and auxiliary facilities."

American Central's plant comprised five main buildings, originally designated as (1) stamping, (2) assembly, (3) paint and trim, (4) test (including the export department) and (5) shipping.

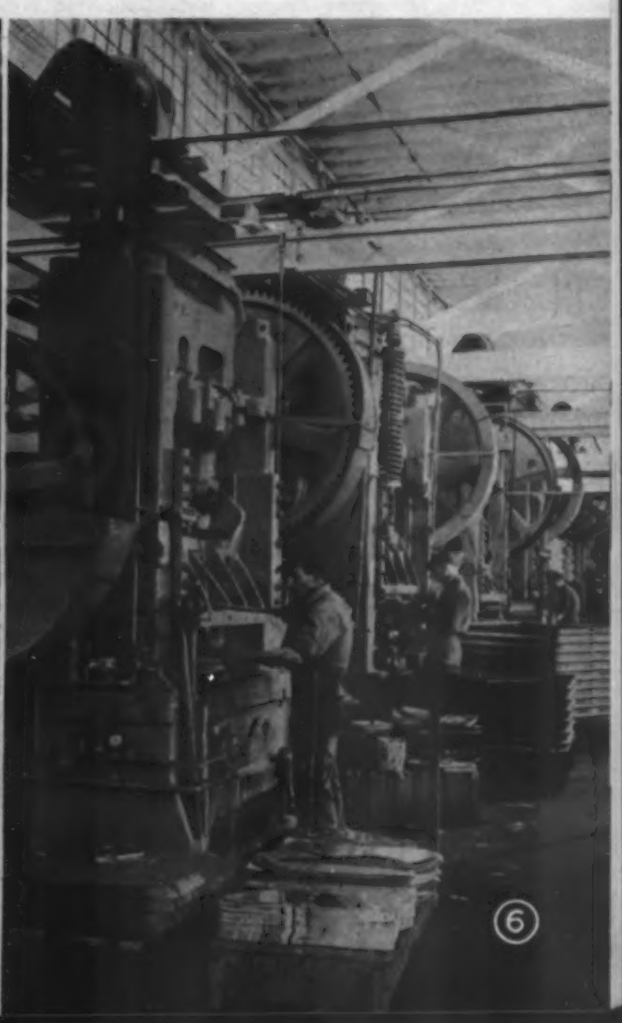
In the stamping building, automobile bodies were completed in the white metal, sent by truck to the paint and trim building, forwarded from this point via an overhead ramp to the assembly building where frames joined bodies for final operations before the completed vehicle was turned over to one of the test crews. From testing the unit moved to the shipping building. When, in 1938, the company began the manufacture of a light package delivery truck the shipping building was used for the final assembly and painting operations on this unit for a time.

The first "war" order was received on March 10, 1941. It was for the fabrication of "jeep" bodies. To handle it required additional welding, riveting and painting facilities. The materials handling system also had to be extensively revamped and enlarged. Several hundred new employes had to be trained and put to work on two 8-hour shifts.

For a time the requirements of the government defense housing program kept a part of the company's regular production facilities busy with products reg-

④

⑤



⑥

*Fig. 7—Chain conveyor takes completed bodies down loading platform for transfer to freight cars. This one conveyor saves immense amount of time and labor in loading cars*

*Fig. 8—Wing sections here are carried in wheeled dollies which ride in special rolled steel floor tracks, thus keeping them in line and making movements comparatively easy*

ularly built during peacetime—kitchen cabinets and sinks, metal furniture, etc. However, limitation orders stopped the last of the peacetime production in July, 1941.

Today, as a result of continuing expansion of war work, every available square foot of plant area has been converted to war work.

Biggest expansion, however, and biggest conversion problem in many respects was that which commenced with the receipt of contracts for the production of aircraft wings and other aviation parts vital in air warfare. In addition to the installation of entirely new equipment, assembly jigs, riveting, welding and special handling equipment, this part of the program has required the training and employment of more than an additional 1400 new workers to date, several hundred of them women. Employes here work two 10½-hour shifts, six days a week (63 hours total).

Today the work in progress in American Central's plant divides the building facilities into two areas of almost equal size.

One wing of the plant, the first to get into the production of war materials, is concerned largely with the output of Army jeep bodies, trailer bodies and airplane exhaust manifolds. In this unit, only the stamping building with its huge batteries of presses retains any semblance of its pre-war arrangement of equipment.

Volume of work now being handled by these presses has grown to proportions which exceed many times over the amount handled at any time previously. Best measure of this expansion is that afforded by the changes which had to be made in the handling of the tool and die work, most of which was once done by the company's own shop forces.

The tool and die department is located at the end of the stamping building and is busier than ever before, but *almost solely on the maintenance work in connection with tools and dies.* Whereas 60 per cent of the tools and dies used in connection with the press work once were made right in this department, fully 90 per cent of this work now is farmed out—such is the volume of work to be done, the pressure to get it done quickly, and the pre-occupation of the company's own staff of skilled men with the maintenance and try-out side of the tool and die work.

The assembly of jeep bodies commences at the end of the press room. Together with the trailer body assembly, these units are carried along on roller conveyors through a succession of welding operations which extend over into the next building which was once occupied by assembly lines, paint lines and drying ovens for kitchen cabinets, refrigerators, etc. Where possible, special jigs have been introduced into the subassembly lines to facilitate the positioning and handling of the jeep and trailer units for the various gas and electric welding operations. Overhead trolley conveyor lines are used to carry the units from final assembly into the cleaning, painting and drying operations. Additional drying ovens have been added which practically double the facilities afforded by two 880-foot gas-fired ovens originally available in the plant.

### First Wing Handles Shipping

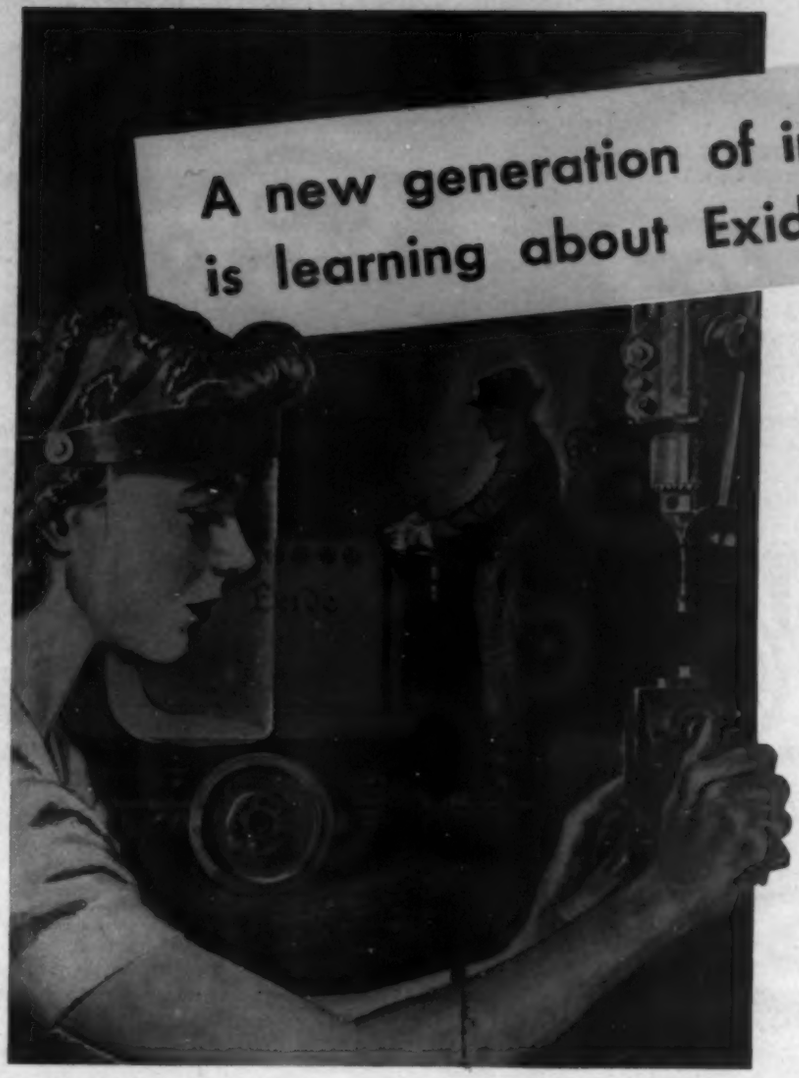
The final building in this first wing of the plant is given over entirely to jeep and trailer shipping operations. As shown in one of the accompanying photographs, jeep bodies are shipped in railroad cars spotted at one end of a long switch while trailer bodies are handled at the opposite end of the switch. The overhead trolley conveyor line has been made long enough to permit the thorough drying of the paint on these units before they arrive at the unloading point for final shipment.

The second wing of the plant has been given over entirely to the fabrication and assembly of aircraft wings and other parts. Equipment to do this work naturally is all new and was designed especially for the jobs in hand.

Layout of the equipment in these buildings is likewise new from start to finish. Any resemblance to the old departmental organization which served for the assembly of automotive bodies, kitchen cabinets and refrigeration units is purely accidental. In the new arrangements of equipment, particular attention has been given to the development and installation of special jigs for holding the aircraft wings and other parts during the various stages of manufacture and assembly.

Considerable attention also has been directed to solving the many materials handling problems involved in getting a large number of small parts to their point of use at the right time and in the right quantities to keep production moving at

# A new generation of industrial workers is learning about Exide dependability!



New workers are enlisting every day in America's industrial battle. Many of them have been unfamiliar with motive power batteries and the equipment powered by dependable Exides . . . but that picture is changing fast. The simplicity, efficiency, and long life of Exide Ironclad Batteries is convincing these new workers of something experienced operators have always known . . .

**Exide IRONCLAD BATTERIES**

## . . . are leading a war of movement on the home front!

**ANY WORKER CAN FOLLOW THESE EASY MAINTENANCE STEPS . . .**

Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.

Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.

Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.

Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long life built into every Exide Battery. Ask for booklet form 1982.

**Exide IRONCLAD BATTERIES**

**1** **High Power, More Production:** To get the most from any battery-powered electric vehicle, its battery must deliver good voltage, hold that voltage high, and be ready for emergency demands with a giant surge when needed. Exide Ironclads do just that.

**2** **Long Life, Saves Materials:** Rugged Exide Ironclads are built to last, and save vital materials by getting maximum use from everything that goes into their making. When you buy an Exide you definitely —Buy to Last and Save to Win!

**3** **Easy Maintenance Saves Labor:** Exides are kept charged by the simplest method ever devised. With the Exide Charge Control Unit there's nothing to do but connect the battery to the charging source and turn a knob.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
Exide Batteries of Canada, Limited, Toronto

a rapid rate. Wherever possible, short sections of conveyor line have been introduced to expedite such subassembly operations as welding and riveting, and to move parts through cleaning, painting and drying cycles.

Women workers are being employed in large numbers in this section of the plant to do riveting, welding and assembly work. Special training classes for small groups of both men and women have been started to qualify the more adept among them for work requiring higher levels of skill. These classes offer intensive work in specialized welding, the more complicated riveting operations, etc.

For the men there are classes designed to train many of them to assume supervisory posts of increased responsibility. All of this training work is sponsored and handled entirely by company personnel. It supplements rather than duplicates in any respect the broad preliminiary training which is offered employes prior to and in the early stages of their employment in the company.

One year after Pearl Harbor, American Central could count these accomplishments in its conversion to war work:

—A volume of jeep bodies, trailer bodies, and other military vehicles, ten times greater than the maximum volume of automotive units ever produced in the same plant, even during the heyday of its peacetime operations.

—A doubling, tripling and in some instances a quadrupling of manufacturing facilities to reach the production output required by the war program. Gas and electric welding equipment both have been increased many-fold. Capacity of drying ovens has been approximately doubled. A half mile of new roller conveyor lines has been added to existing facilities. Paint lines have likewise been lengthened many times over to accommodate the volume of work to be handled.

—A tenfold increase in plant personnel since 1940, recruited, trained and put into volume production in record time.

## SIMPLE PARTS BIN SAVES 360 MAN-HOURS

THREE hundred and sixty man-hours per week are saved by the simple setup shown above suggested by two employes in the plant of Curtiss-Wright Corp. It consists of nothing more than a parts bin installed on the dollie carrying an airplane wing along its course of production

## Bureau of Mines Publishes Circular on Kyanite

To encourage domestic production of raw materials suitable for use in furnace parts and linings, the Bureau of Mines has published an overall survey on marketing kyanite and allied minerals that can withstand the high temperatures in modern metallurgical processes and will not react with the substance being melted, Dr. R. R. Sayers, bureau director, announces.

Commonly known as the "sillimanite group" of minerals, kyanite, andalusite, sillimanite, dumortierite, and mullite and the related minerals, topaz and pinite, also can be employed in such refractory products as spark-plug insulators, laboratory ware, tanks for the glassmaking industry, and saggers and kiln furniture for the chinaware and pottery trades, all of which require materials with high melting points.

Most of the products of this group of minerals have good insulating power even at high temperatures, low thermal expansion, and resistance to sudden changes of temperature and to the corrosive action of certain fluxes and furnace gases, the report says.

The bureau publication offers detailed information on the occurence, properties, qualities, uses, sources of supply, markets, and prices of these minerals, together with a list of potential buyers and a bibliography.

A copy of the report may be obtained by writing to the Bureau of Mines, Department of the Interior, Washington, for Information Circular 7234, "Marketing Kyanite and Allied Minerals."

## X-Ray Technique for Industry and Research

*X-Rays in Research and Industry*, by H. Hirst; cloth, 129 pages, 4¾ x 7¼ inches; published by Chemical Publishing Co. Inc., Brooklyn, N. Y., for $2.50.

This work describes types of problems in industry and in research, particularly those coming within the field of physical metallurgy, for which application of X-ray methods offers a solution. Most suitable methods of approach to these problems are described in detail, with actual practice and calculations of X-ray technique.

It provides in one volume a thorough and self-contained study of the principles of X-ray technique and the versatility of its application. References have purposely been kept at a minimum but are adequate to obtain a good grasp of the subject and to act as a guide to a study of those advanced phases that are not covered fully in the text.

# 74"

The 74" CUT MASTER is available!!! Here's the BULLARD VERTICAL TURRET LATHE—largest size—on definite government instructions. A limited number of these machines are available for those plants whose work demands heavy cutting, high speeds, and a variety of operations.

20 speeds in each range for heavy work from 1.24 to 45 R.P.M. . . . For light metal, fast cutting, from 3.29 to 120 maximum R.P.M. with two other ranges between.

16 feeds in geometric ratio from .0026 to .500 per revolution . . . rapid traverse on all heads in any direction.

This CUT MASTER can be purchased with any combination of ram heads, right hand turret head, side head, and can also be equipped for thread cutting, drum scoring or angle turning in addition to the swiveling of main heads. Circular on request.

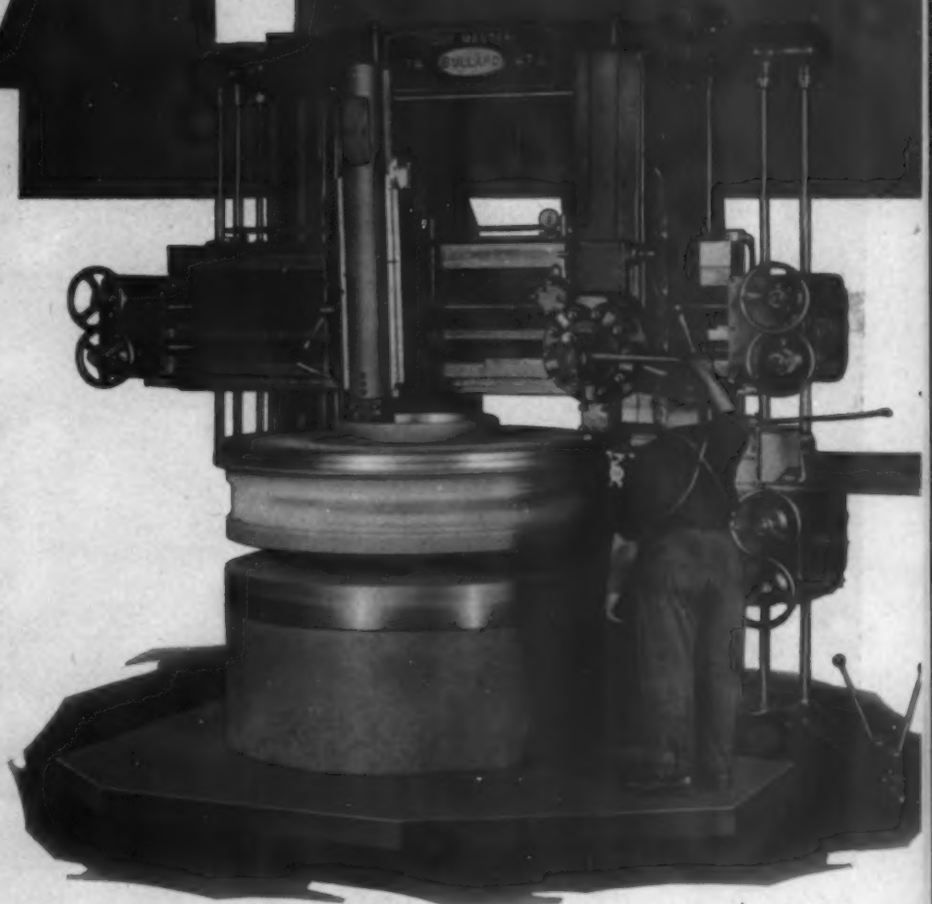


*Photo above shows multiple operations in simultaneous cutting.*

★ ★ ARMY E NAVY ★ ★

## THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

**TOTAL WAR** needs total production. For maintenance of peak output in *STEEL MILLS* use . . .

**. . . . . SINCLAIR LUBRICANTS . . .**
These highly efficient greases for roller bearings, gears and cables . . . specialized oils for turbines, compressors, circulating systems, and quality cutting, tempering and quenching oils promote full schedule operation.

*Write for "The Service Factor"—a free publication devoted to the solution of lubricating problems.*

# SINCLAIR INDUSTRIAL OILS

*FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE NEAREST SINCLAIR OFFICE*

SINCLAIR REFINING COMPANY (Inc.)

2540 West Cermak Road, Chicago • 10 West 51st Street, New York City • Rialto Bldg., Kansas City • 573 West Peachtree Street, Atlanta • Fair Building, Ft. Worth

## Radiology Text Brings Subject Down to Date

*Industrial Radiology*, by Ancel St. John and Herbert R. Isenburger; second edition; cloth, 298 pages, 6 x 9 inches; published by John Wiley & Sons Inc., New York, for $4.

The purpose of the authors was to present the practical aspects of industrial radiology in a form understandable to students, laymen and engineers who desire useful knowledge of the basic theories involved. No attempt was made to produce a scientific treatise or comprehensive work on all the theories.

Publication is designed to aid workers in the field to perform investigations or inspections more easily, stimulate teaching and study of industrial radiology in technical schools and direct attention of engineers and others to the potential value of this new technique where its use has not been fully realized before this time.

The revision was dictated by need for bringing material up to date, the first edition being nine years old. The title was changed from *Industrial Radiography*, the new name including radiography and fluoroscopy.

A master index is provided to make all the applications and possibilities of radiology available for reference without enlarging the text unduly. New material has been added on equipment and accessories, with latest developments and improvements in tools and technique.

---

### Standard Lathe Fitted with Controls To . . . .

# Form-Turn Parts Automatically

FORGED steel parts for torpedoes are now being form-turned automatically on a standard Bullard vertical lathe without special rebuilding of the machine or without special training of the operator and at much greater speeds and accuracies than was possible with manual control alone.

A Duplimatic, a precision machine-tool control manufactured by Detroit Universal Duplicator Co., Detroit, is employed to turn the horizontal and vertical feed screws of the Bullard roughing cut and securing such accuracy on the finish cut that hand-finishing has been greatly reduced and scrapped work virtually eliminated.

Close limits are possible because the control turns two feed screws simultaneously yet independently of each other and entirely independent of machined feed.

Moreover, other work, also re-quiring duplicating in two dimensions on a full automatic basis without machine feed, is to be alternated with the torpedo part turning.

The two drive heads—consisting of hydraulic motors and reduction gearing—are directly connected to the vertical and horizontal feed screws respectively and are connected by means of heavy duty hose with the control which is shown in the foreground of illustration.

The tracer mechanism, mounted solidly on the bed of the lathe, is so arranged that its stylus can encounter the edge of a metal templet which is mounted on the head and moves with the cutting tool.

The operator's control panel with start, stop and four change-of-direction buttons is located immediately below and to the left of the drive heads.

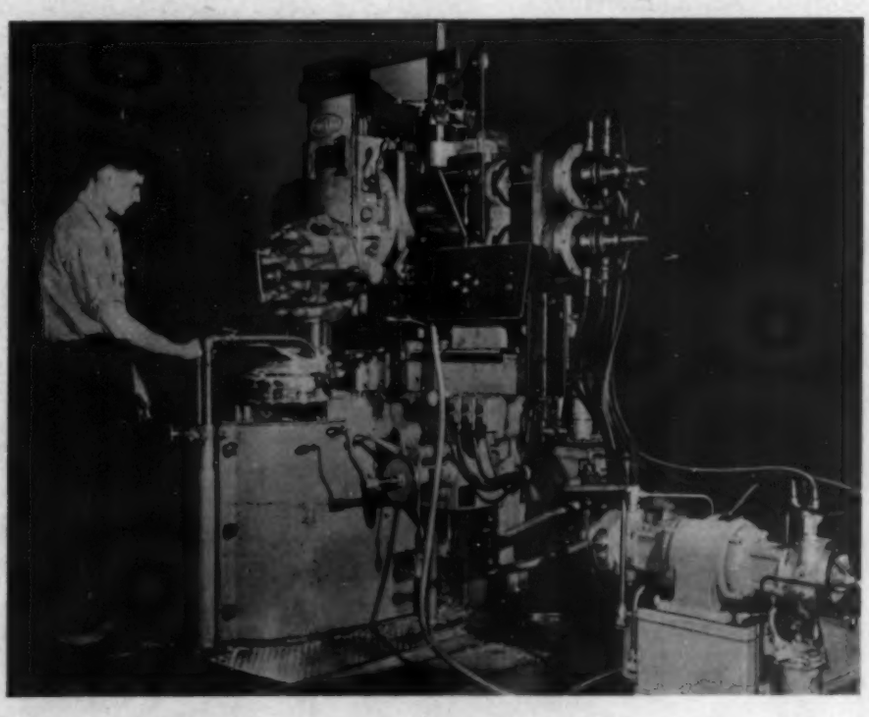
When the work is loaded, the operator touches the start button and the cutting tool moves in toward the work. As the tool approaches the work, the stylus of the tracer encounters the templet and, through the control equipment, turns the horizontal feed in relation to the vertical feed so that the tool moves in exact conformity with the outline of the templet. Thus, the exact contour of the templet is reproduced on the work itself.

While speeds of feed, type of steel and other production data cannot be revealed, some idea of the capacity of the Bullard with this control will be had by noting the great depth of the cut.

Two cuts are made on this same machine—roughing cut and finishing cut. Both are controlled automatically and both are run at high speed.

It is expected that this same machine will also be used for work requiring manual control alone. Change-over to do this requires only the "de-clutching" of the drive heads and the removal of the tracer head from its mounting bracket.

When other work which also requires the duplicating control is to be machined, the templet is removed and replaced by one having the contour of the new work. No other changes are required.



*Standard vertical Bullard lathe is equipped with automatic control. Work is shown immediately in front of operator, center left. Control board with start, stop and four change-of-direction pushbuttons is center right. Templet and tracer mechanism is at top center. Detroit Universal Duplicator Co. photo*

# INDUSTRIAL EQUIPMENT

## Fastening Bracket

Tinnerman Products Inc., 2039 Fulton road, Cleveland, announces development of a new fastening bracket to combine a bracket and fastening means in a single stamping. It also permits the

use of standard bonding clamps in place of ear-type aluminum bonding clamps in the assembly of conduit and piping in aircraft. In this new fastening, one or more Speed nuts are formed as an integral part of the bracket. This is said to reduce the number of parts and to save weight. The combination also permits adjustment of conduit or piping at any angle with the use of an ordinary screwdriver.

## Lift Truck Attachment

Towmotor Corp., Cleveland, is offering a new shovel type scoop which can be interchanged with standard forks for picking up, carrying and dumping all types of loose bulk materials. It is designed to handle such materials as ore, glass and metal scrap, foundry sand and bulk chemicals.

Available in capacities from 8 to 25 cubic feet, the scoop is manually con-

trolled. It can pick up or dump materials at any point within the lift range. Resetting to digging or carrying position after dumping is accomplished by lowering to floor level until spring-operated catches automatically take hold.

An optional feature is an anti-spilling device which fits over the front lip of the scoop and permits transporting full loads of loose material at good speed over rough surfaces.

## Heavy-Duty Drill

Skilsaw Inc., 5033 Elston avenue, Chicago, announces a new model "47" ¼-inch heavy-duty drill designed especially to speed up tough "skin-drilling" in airplane construction. It is equally as suitable for production jobs involving steel and wood.

The model is small, light and compact. It weighs only 3½ pounds; measures 7¼ inches long; only 2 9/16 inches wide. The electric tool features a die-cast body, helical-cut gears and anti-

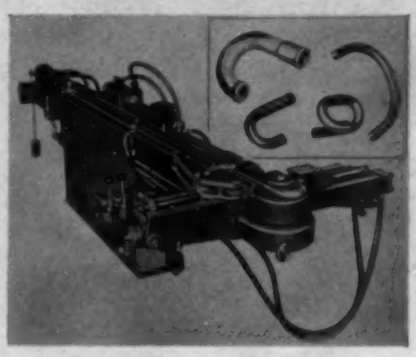
friction bearings. Powerful motor provides 4 speeds—1800, 2500, 3500 and 5000 revolutions per minute. A two-pole momentary contact switch with lock allows for continuous operation.

## Booster Attachment

Pines Engineering Co., Aurora, Ill., announces the addition of a new patented booster attachment to its line of hydraulic bending machines. It assures shorter radius bends, faster production and saves man-hours, it is said, besides permitting operation by women.

The attachment is in form of a separate cylinder through which the mandrel rod passes. As the tube advances on the mandrel during the bending operation, the booster cylinder applies pressure to the rear end of the tube and relieves the tension that is ordinarily required to draw the tubing off the mandrel from the already bent portion of the tube.

In bending practice the shortest radius bend that is possible to make is not determined by the maximum permissible elongation in the material, but is determined by the tension permissible in the already bent portion of the tube which must transmit the force required to draw a tube over the mandrel tip. When this force becomes too great the bent section will collapse from this tension. The booster attachment by relieving this tension permits bends to be made with a radius which will allow



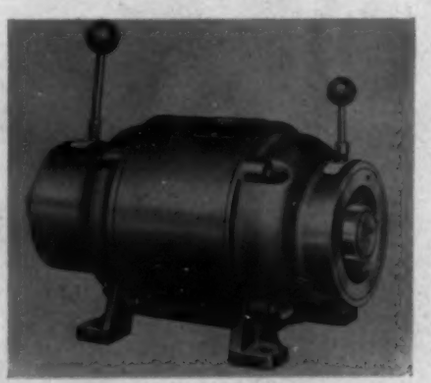
the stretching of the metal up to its maximum elongation.

A further advantage of the attachment, according to the company, is that by allowing the presure on the end of the tube to continue after the tube is unclamped in the bending dies, the tube that has been bent is automatically removed from the machine, thereby increasing production. This is particularly desirable when making 180 degree bends which frequently become wedged in the dies and must be removed by force.

## Polishing Lathe

Crozier Machine Tool Co., Hawthorne, Calif., is offering a new polishing lathe that incorporates a clearance hole through the entire machine. This feature, it is said, permits polishing a portion of a long piece of work up to the maximum capacity of the lathe, and is ideal for high volume production.

Work can be loaded and unloaded



while the spindle is in rotation. Positive opening and closing of the collet is provided through a double-face cam operating mechanism which is hardened and precision ground. Adjustments are made on the lathe without tools; mere-

## KILLED OR INJURED AT WORK LAST YEAR—

# 1,618,000 MEN!

### HELP PREVENT MANY ACCIDENTS BY USING

### AMERICAN CABLE TRU·LAY *Preformed* WIRE ROPE

During the first twelve months of this war more than 1½ million men were killed or injured by industrial accidents. That tremendous loss in productive time and needed man-power undoubtedly prevented the quick winning of several battles. Indeed, according to the National Safety Council, the lost-time through accidents could have supplied war equipment for 110,000 soldiers, sailors or marines. *And the shame of it all is that many of these accidents were needless.*

One way many operators have reduced time-out accidents is through adoption of TRU-LAY PREFORMED WIRE ROPE. American Cable TRU-LAY is a *safer* rope to handle because it is preformed. TRU-LAY is flexible, tractable, willing to do what is required of it without crankiness. It resists kinking and snarling and possesses remarkable fatigue resistance. More than this, broken crown wires in TRU-LAY Preformed do not wicker out to jab and tear workmen's hands. TRU-LAY doesn't ravel (and ruin itself) when cut or broken. For your next line, specify American Cable TRU-LAY Preformed. Do everything possible to reduce lost-time accidents.

**AMERICAN CABLE DIVISION**

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Tacoma

**AMERICAN CHAIN & CABLE COMPANY, INC.**

BRIDGEPORT, CONNECTICUT

ESSENTIAL PRODUCTS . . . TRU-LAY Aircraft, Automotive, and Industrial Controls, TRU-LOC Aircraft Terminals, AMERICAN CABLE Wire Rope, TRU-STOP Brakes, AMERICAN Chain, WEED Tire Chains, ACCO Malleable Castings, CAMPBELL Cutting Machines, FORD Hoists, Trolleys, HAZARD Wire Rope, Yacht Rigging, MANLEY Auto Service Equipment, OWEN Springs, PAGE Fence, Shaped Wire, Welding Wire, READING-PRATT & CADY Valves, READING Electric Steel Castings, WRIGHT Hoists, Cranes, Presses . . . *In Business for Your Safety*

ly turning the hand grips will tighten or loosen collet tension.

A switch and mechanical brake control makes the machine adaptable to work which can be loaded better when the spindle is stationary. The control lever first cuts off the power from the motor and gradually, but firmly, applies a molded disk-type facing against a cast iron flange. The entire motor is dust tight, excluding all abrasive material. The lathe is offered in fourteen models varying in horsepower, capacity, arrangement for collets or chucks, etc.

## Explosion-Proof Motors

Fairbanks, Morse & Co., 600 South Michigan avenue, Chicago, is offering a new line of vertical hollow shaft ex-

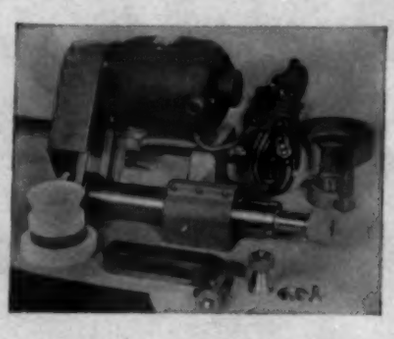
plosion-proof motors for operation in Underwriters' class I group D hazardous gas locations. These are designed primarily for pumps handling large quantities of volatile materials such as high octane aviation gasoline. They make up part of the special equipment required for efficient handling of gasoline in fueling planes at numerous air fields, as well as for transferring gasoline from tankers to storage locations.

## Tool Post Grinder

Lempco Products Inc., 5700 Dunham road, Bedford, O., announces a new TPG tool post grinder — a small heavy-duty unit for internal, external, face and taper grinding on lathe, shaper, planer, miller or bench. It grinds holes 8 1/2-inches deep and produces mirror-like finishes.

A quill adjustment provides the equivalent of two different length quills because the motor may be shifted 2-inches on a slide bracket. The grinding quill likewise is adjustable 2-inches. This feature is reported to save considerable setup time on jobs that require different length quills.

According to the company, the quill



assembly is balanced statically and dynamically. It is mounted in four preloaded matched sets of ball-bearings constantly lubricated in a fog oil bath. A 2-step V pulley provides spindle speeds of 6000 to 13,000 revolutions per hour. Included as standard equipment are a wheel guard, diamond dresser, abrasive wheels and spindle extension.

## Signalling Searchlight

General Electric Co., Schenectady, N. Y., announces a 12-inch signalling searchlight featuring all-welded construction designed especially to withstand shipboard vibrations and sudden shock. Made of bonderized steel, it is intended for use on cargo vessels and transport ships.

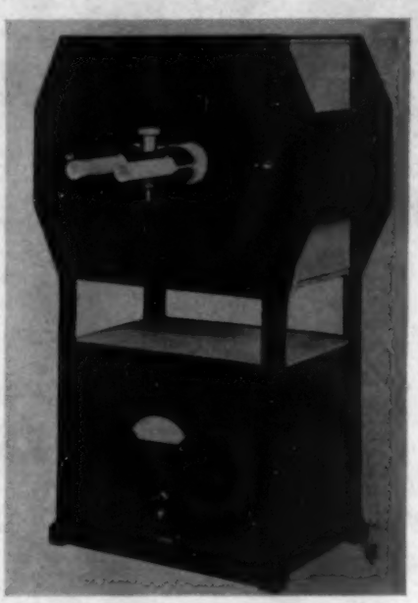
The shutter of the unit, which can be operated from either side of the drum, withstands more than two million operations at the rate of 180 operations per minute, it is said. The front

glass is of the fixed type and is held in place rigidly. Access to the interior for relamping of the 1000-watt lamp is gained through a rear-opening door.

The reflector is a standard silvered-glass searchlight type, with a specially treated backing of fired porcelain enamel and copper plating. Supporting trunnion arms are heavy steel tubing, and are welded to other parts of the mounting assembly to form a one-piece construction which eliminates the danger of loosening joints. All handles are of molded plastics.

## Laboratory Furnace

Harry W. Dietert Co., 9330 Roselawn avenue, Detroit, is offering a new high temperature Glotemp laboratory combustion furnace for use in rapid carbon and sulphur determinations of ferrous and nonferrous metals. Outstanding feature of the unit, it is reported, is its short overall length yet efficient com-



bustion zone. Heating elements are placed in the furnace at right angles to the axis of the combustion tube. In this position exposed ends of the heating elements and the electrical connections do not take up space along the axis of the combustion tube.

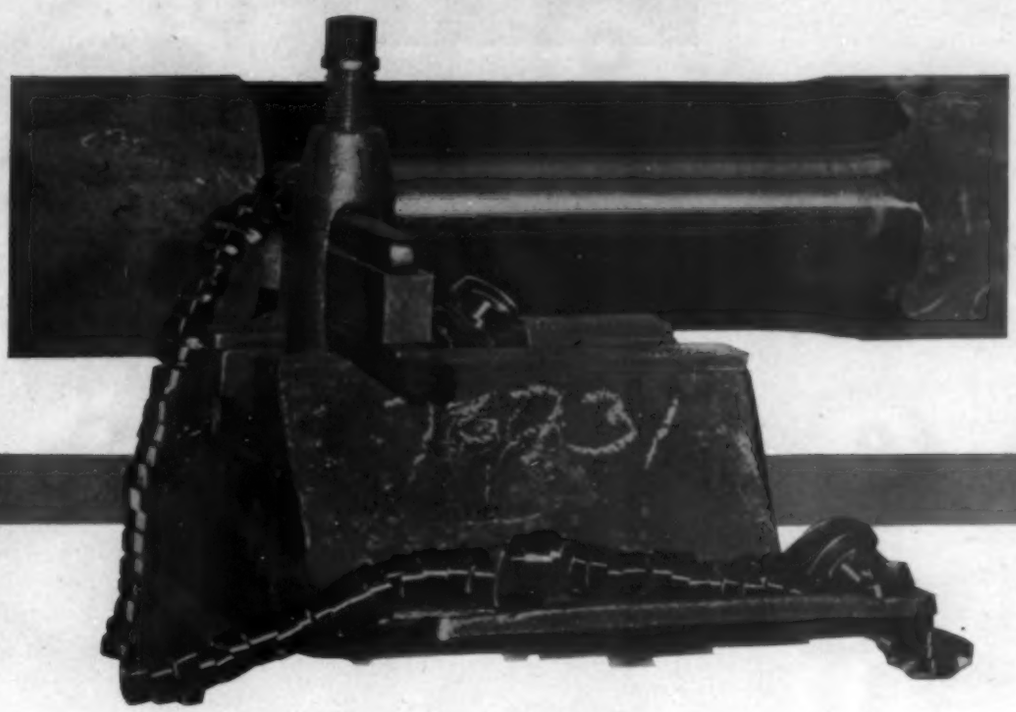
The use of a small combustion tube speeds up the carbon and sulphur determinations considerably because a smaller volume of gas need be handled. In this improved furnace, the heat is confined to the section of the tube where it is required for the rapid combustion of the sample.

Overall length of combustion tube recommended for this furnace is that both ends of the combustion tube are fully exposed to the room atmosphere, insuring efficient cooling of the tube ends to a low temperature avoiding oxidation of rubber connections.

Electrical accessories, such as trans-

# *Employ* KENNAMETAL* Carbide Tools

## IF LOSS OF SIZE IS RETARDING YOUR PRODUCTION



Rejections or re-working of machined steel parts represent a loss of man hours—a loss that prevents economical production and retards the war effort. When ordinary carbide tools are used on long cuts, a large percentage of these rejections results from excessive taper caused by tool wear.

This tool wear is often caused by insufficient clearance angles, which have been used in order to provide support for a weak cutting edge. KENNAMETAL'S high tensile strength permits clearance angles large enough to prevent excessive tool wear and yet afford proper support to the cutting edges.

KENNAMETAL'S ability to "hold-size" aids in eliminating loss of size on steel cutting operations.

If taper caused by tool wear is preventing maximum, economical production in your shop—use KENNAMETAL steel-cutting carbide tools for all boring, turning, and facing operations. Catalog on request.

*INVENTED AND MANUFACTURED IN U. S. A.

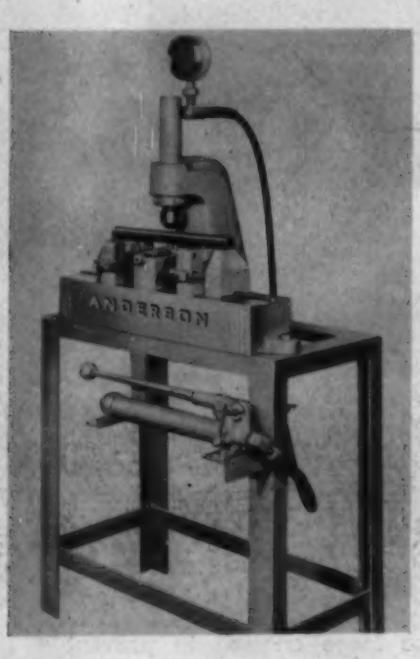
McKENNA METALS Co.
200 LLOYD AVE., LATROBE, PA.
Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York
Exclusive of Canada and Great Britain

formers, voltage control, switches for regulating the furnace temperature and the pyrometer are all housed in the lower compartment of the furnace. Weighing 195 pounds the unit measures 31 x 19 x 15 inches.

## Straightening Press

Anderson Bros. Mfg. Co., Rockford, Ill., is offering a new high speed model HP-010 hydraulic straightening press for shafts. It handles work up to 1½ inches in diameter and has a capacity up to 20,000 pounds.

Design of the press, it is said, elimi-




nates moving shaft from anvils to centers for checking. Checking and bending is done in the same position. When pressure is released, the spring tension on rolls brings the shaft free of the anvils and free to rotate for checking. The checking rolls are adjusted easily for different lengths of shafts and can be removed if necessary.

Press equipment includes indicator gage calibrated in thousandths of an inch for locating high and low spots on shaft, a pressure gage calibrated in pounds.

## Spare Parts Box

Stackbin Corp., 68 Troy street, Providence, R. I., is offering on the market an all-welded spare parts box designed for manufacturers who have to ship assortments of spare parts along with the products they're making for the Army and Navy. These are being made in a wide variety of sizes and styles to meet different requirements.

Every box is constructed to standard government specifications.

## Airconditioner Unit

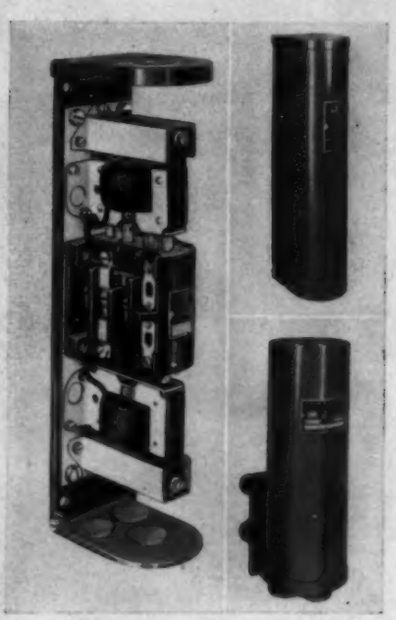
Paasche Airbrush Co., 1933 Diversey Parkway, Chicago, is offering a new type airconditioner unit for removing water, oil and dirt from compressed airlines. It is reported to be 96 per cent efficient.

The unit is constructed on non-corrosive metal throughout and filtration is mechanical with no moving parts. The drain operates on a new principle which provides the most reliable method for water removal under all conditions, it is said. In the unit an airregulator insures precise regulation of working air-pressure. The unit is supplied in five

sizes, and with one to three outlets, 6 cubic foot, 12 cubic foot, 24 cubic foot, 48 cubic foot and 96 cubic foot.

## Reversing Switch

Furnas Electric Co., 449 McKee street, Batavia, Ill., is offering an improved 5-horsepower magnetic reversing switch which is made as a single unit instead of being made up of two separate contactors. This design, it is said, is especially suited for severe plugging service and other heavy duty. Large, double-break silver contacts, the absence of pivots or bearings contribute to the long-life of the switch. The unit permits reversing control of motors by use of push-button near or at a distance



from switch or motor. It consists of one contact assembly and two magnets. Its overall measurements are 12⅜ x 3¾ x 3 inches.

## Welding Electrode

Metal & Thermit Corp., 120 Broadway, New York, is offering a new all-position alternating-current electrode for electric welding. Known as Murex type A, it allows both overhead and vertical welds to be made without use of a highly specialized welding technique, according to the manufacturer.

The electrodes meet requirements for grade E-6011 electrodes, under A.W.S.-A.S.T.M. specifications A-233-42T, for grade III, classes 1 and 2, under United States Navy bureau of ships specification 46E3, and for grades H1G, B1G and E2G, American bureau of shipping, the manufacturer states. They are available in 3/32, ⅛, 5/32 and 3/16-inch sizes.

Typical physical properties of the weld metal, as welded, include yield points of 52,000 to 61,000 pounds per square inch, ultimate strength of 62,000 to 71,000 pounds per square inch, and an elongation of 22 to 26 per cent in 2 inches.

# Why Roper Pumps

*perform better*
*... last longer!*

## GEARS THAT FLOAT IN OPERATION!

The pumping gears in ROPER "hydraulically balanced" PUMPS have hollow shafts so that internal pressure is equalized at all points. These gears, entirely separate from the drive shaft, are connected only by a sliding joint which permits them to actually "float" in operation. This sliding joint plus a special collar on shaft absorbs any shock or end thrust.

This feature means big savings in time and money because "hydraulically balanced" pumps are more efficient, last longer and permit periodic inspection of internal parts without disturbing piping of power unit.

## REPLACEABLE BEARINGS

The 4 large bearings (two on each side) in ROPER PUMPS are designed and constructed to withstand severe operating abuses and adequately handle peak loads. These flanged high lead bronze bearings also act as wearplates to protect face and backplate from wear. Can be replaced easily and inexpensively.

*"You Can Rely on Roper"*

HYDRAULICALLY BALANCED

## *Write for Book No. 948*

A complete summary and digest of factual information concerning pumps and pumping problems.

# ROPER

*Rotary Pumps*

GEO. D. ROPER CORP., ROCKFORD, ILLINOIS
PITTSBURGH OFFICE, 207-209 BLVD. OF THE ALLIES

**ACCURATE TO YOUR SPECIFICATIONS**

**The Thomas Steel Company has had many years of broad experience in producing cold rolled strip steel to exacting specifications. Especially during the past years of war production, Thomas engineers have added many new and proven facts to their data files which may be applied to your most difficult problem. Therefore, when you are planning a new product, you will find it well worth-while to submit your specifications or samples to The Thomas Steel Company. Have Thomas engineers double check your specifications and prove your die tryout with specially prepared samples. You may also be able to obtain higher production with savings in material by using Thomastrip in bright uncoated or electro-coated finishes.**

**A new, easy to read and easy to use Thomas Steel Book . . . it contains pricing data and general information on rolled strip steel in low carbon, high carbon, and flat wire, as well as on Thomastrip with electro-coated finishes. It's ideal for buyers and engineers.**

THE THOMAS STEEL CO. • WARREN, OHIO

BRIGHT FINISH NOT COATED, SOLDER-COATED, ELECTRO-COATED WITH NICKEL, ZINC, COPPER, BRASS


## NE Alloy Steels

(*Continued from Page 84*)

used in aircraft engines, listed in part with their AMS numbers in Table I, to eliminate the waste of these residual alloys by utilizing to the fullest extent all three of the involved alloying elements, nickel, chromium and molybdenum. This makes possible a "dilution" of the old steels, with the result that for equivalent physical properties, the new steels require smaller percentages of each alloying element by combining the effects of all three.

In general, the largest savings are being made in nickel, through the addition (plus residuals) of chromium and molybdenum to the nickel steels, molybdenum to nickel-chromium steels and chromium to the nickel-molybdenum steels. Chromium will be saved by the use of nickel in chromium-molybdenum steels and molybdenum in the nickel-chromium steels. However, the only net savings, in the true sense of the work, will result from the use of residual elements and, in the case of most aircraft alternates, a smaller percentage of total alloy content, off-set by the use of molybdenum as in the case of the higher alloy carburizing types.

### New Steels Save Nickel

Substantial savings in nickel and chromium will be made, through the use of the new steels in aircraft engines, but not without a corresponding increase in molybdenum. By adding 2.42 pounds of molybdenum, it is possible to save 10.85 pounds of nickel and 6.8 pounds of chromium in just a single 14-cylinder engine. These are estimated savings (neglecting residuals) of nickel and chromium (and the added requirement for molybdenum) as a result of the application of alternate AMS steels to aircraft engines.

Given a required set of physical properties established for aircraft engines by previous experience, it has remained for the metallurgists to choose for application to engine parts those NE steels which would provide uniform hardening throughout all sections of those parts, with a minimum of internal stress induced by the hardening procedure. Water or brine quenching would often produce the full hardening required with plain carbon steels. But to prevent setting up internal stresses and thus increase the reliability of the parts, a less drastic quenching or hardening action is required along with lower carbon contents. The residual alloys—nickel, chromium and molybdenum in this case—provide the answer, since in proper proportions they make possible the required full section hardening of

# TAYLOR-WILSON

## Hydraulic Tube Testing MACHINE

**For Testing Tubes 500 to 6,000 lbs. pressure per square inch**

This sturdy machine has what it takes for hard continuous hydraulic testing service. It occupies minimum floor space, operates economically and is a bear for production. Now serving successfully throughout the steel industry, in vital war work. Machines built in different sizes. Each machine accommodates a large range of different tube diameters.

**CHARACTERISTICS**

Ease of changing pressure from 500 pounds to 6,000 pounds per square inch. Wide range of sealing pressures avoiding tendency to buckle tube, thus eliminating excessive pressure on sealing packings.

Test pressure and sealing pressure are applied simultaneously.

Minimum time in changing for tubes of different sizes. When changing lengths, it is necessary only to move traveling carriage, the throw-out clamping and supporting carriages, along the rails.

When changing diameters, it is necessary only to change the test heads and adjust supporting rollers to bring tube to proper alignment, the clamping device being so designed as to accommodate the different tube diameters.

Machine is of the two bar type, the bars being supported at regular intervals. There is no overhead bar to cause deflection that tends to loosen tube connections when test pressure is applied.

The machine occupies a minimum of head-room and is therefore readily accessible for crane service.

The Taylor-Wilson Tube Testing Machine is supplied complete with hydraulic system which means that the user needs to furnish only foundations and connect electric service lines.

Further information upon request.

We also manufacture Straightening, Burnishing, and Sizing Machines, Tube Cutting-Off Machines, Galvanizing equipment for pipe, Small Seamless Tube Mills, Butt Weld Pipe Mills, and a complete line of equipment for the finishing of pipe.

# TAYLOR-WILSON MFG CO.

## 15 Thomson Ave., McKees Rocks, Pa.

PITTSBURGH DISTRICT

Try to hold two pencils in perfect end-to-end alignment without touching each other, while you count ten!

Even if you brace your hands, wrists or arms as solidly as you can, you will quickly see why Ajax FLEXIBLE Couplings are essential to protect direct-connected machines from unavoidable misalignment.

Remember, too, that you are making this test with pencils weighing only an ounce or two . . . instead of costly machines driven twenty-four hours a day at high speeds by plenty of horsepower!

Manufacturing executives, design engineers, plant superintendents, and maintenance men are invited to write for the Inside Story of Ajax Flexible Couplings.

AJAX

FLEXIBLE COUPLING CO.
WESTFIELD, N. Y.

*Incorporated 1920*


parts by quenching in a hot milder-acting oil.

The "hardenability" of a steel is a measure of the depth to which the steel will harden above a chosen hardness level as a result of a specified quenching or cooling rate. It is apparent that in the selection of new steels for aircraft engine parts that hardenability (not to be confused with intensity of hardening which is primarily a function of carbon content) constitutes the most important factor in appraising the new steels in terms of the old.

Hardenability of oil hardening aircraft steels may, of course, be measured by quenching round bars of increasing diameters in oil and determining from the hardness produced across sections of the rounds the maximum section which may be fully hardened with each steel considered. However, a more complete measurement of hardenability, and one which is simpler and more reproduceable, is made possible by the standard Jominy end-quench test. This method involves water quenching the scale-free end of a 1-inch diameter by 3-inch long bar by suspending the properly heated bar at a fixed distance over a jet of water at 75 degrees Fahr. plus-minus 5 degrees.

In this way, a series of known cooling rates are produced from a maximum at the water-cooled end to a minimum at the opposite end. Hardnesses determined along the side of the specimen are correlated with cooling rates which in turn have been calculated for the centers of various sizes of oil-quenched rounds. Thus, with cooling rate as a parameter, it is possible to compare hardenability of all steels in terms of oil-quenched rounds as well as for other cooling rates. (For details of end-quench test and its use, see STEEL, March 22, p. 78; March 29, p. 76.)

Typical hardenability curves for most of the AMS alternate steels are to be found in Figs. 1 and 2, along with those AMS steels which the alternates will replace. It will be noted in Fig. 1, which includes the noncarburizing steels, that AMS-6412 steel is outstanding in its hardenability and since it is a chromium-nickel-molybdenum type, it will not require an AMS alternate. AMS-6320 and AMS-6322 show hardenabilities which well represent the large group of steels they will replace, as outlined in Table I.

The hardenabilities of the four main AMS alternate carburizing steels are very close to those of the old steels, as shown in Fig. 2.

It will be noted that a wide range of hardenabilities has been represented in the hardenability curves illustrated in Figs. 1 and 2 for application to parts

of all section sizes. In general, the sharp definition of these groups indicates that a very good job has been done in selecting the AMS alternates.

**Application to Specific Parts:** Valve spring washers and locks have light sections but require a comparatively high level of hardness which may be obtained by the higher carbon content of the AMS-6322 steel. In this connection, it should be remembered that in addition to a mild quench, the freedom from internal stresses demanded of an aircraft part also requires thorough stress relieval or tempering after the quench. Higher carbon and the presence of such alloying elements as chromium and molybdenum allow more efficient stress relieval at higher temperatures without a sacrifice of hardness.

Fatigue strength, which is an extremely important design factor in aircraft engine parts, has previously been related to hardness and ultimated tensile strength. Figs. 3 and 4 show fatigue curves plotted from data obtained on R. R. Moore rotating beam machines using representative AMS steels and alternates. For the standard polished specimens the fatigue limits of the new steels have been found consistently to average approximately 50 per cent of the ultimate tensile strength, while the notched specimen (notched after heat-treatment) averages about 15 per cent of the ultimate. These figures have been substantiated by many different types of steel tested in the past and compare favorably to the steels they will replace.

Because of the interest in the properties of both present and alternate AMS steels at the sub-zero temperatures encountered by operation of aircraft at high altitudes, Fig. 5 has been included to show that even as low as minus 65 degrees Fahr. there is no dangerous drop in the impact properties of either the new or the old steels.

**Machinability:** As noted before, it is the adaptability of the alternate steels to production operations that is actually of paramount importance especially at this time when production stoppages cannot be tolerated. For this reason, one of the most important production factors to be considered in the use of the new steels in aircraft engines is their machineability as compared to the present steels. Tentative machineability tests conducted at the Wright Aeronautical Corp. on bar stock has indicated that the alternate AMS steels in both the carburizing and noncarburizing grades will probably have machining properties equal or slightly superior to the present steels.

Tests were run by turning bar stock heat treated identically to the same hardnesses with standard, superfinished

DESIGNED FOR THE AXIS!

The more scrap we throw at our enemies, the quicker we end the war. More and more steel is needed for tanks, trucks, guns, planes, bombs, shells, and countless other war essentials. The mills have been asked to produce 90 million tons this year, which require 45 million tons of scrap metal. Regular suppliers will furnish about half that amount. The deficit must be made up from scrap now lying around idle. There's enough of it, but it will take the combined efforts of all Americans to dig it out and see that it is put to use.

Go over your property carefully. Don't pass up anything. Every pound of scrap counts, and it's needed NOW! The only way the mills will be able to meet their 1943 quota is through an enthusiastic continuation of the scrap salvage campaign. It's an individual responsibility. Everyone must enlist in this drive.

THE ANDREWS STEEL CO.
NEWPORT, KENTUCKY
DIVISIONS
THE NEWPORT ROLLING MILL COMPANY
THE GLOBE IRON ROOFING & CORRUGATING CO.

Our business has always been the making of bolts, studs and nuts to specifications with emphasis on the specials. Our customers are legion; 25 pieces here, a hundred there, and thousands for that special refinery-synthetic plant.

Today your Boss is our Boss and when we ask old customers to be patient, you know what we mean. We are working 100%, day and night, on vital war work, which as you know is scheduled by Uncle Sam with the one thought of winning the war, not of winning or holding good will. That part of business is reserved for peacetime.

SPEED THE DAY OF VICTORY—BUY BONDS

ERIE BOLT & NUT CO
ERIE, PA., U.S.A.

tools at constant feeds and speeds, and comparing finish, tool life, chip formation and machine tool power input per pound of stock removal. Finishes obtained were approximately equal. Tool life has not been accurately compared as yet, since the tool life on both new and old steels has been too high to measure with the limited supply of alternate steels immediately available. Power inputs to the machine tool per pound of stock removal for new and old steels appeared to be identical.

The alternate steels have shown a slightly more desirable chip formation by their smaller and more uniform size. Further tests are required to check the relative machineability of the steels in other machining operations but it is believed that the lower nickel and higher molybdenum contents of the alternate steels will improve machineability somewhat, and in no case show worse results than with the present steels.

### Carburizing Time Consuming

Since most steel engine parts must be heat treated, such operations may become a serious "bottle neck" in the production line. One of the most time-consuming and important operations in heat-treating is carburizing for case hardening applied to all important gears, cams and shafts as listed in Table I. Not only is the time element to be considered but also the case characteristics resulting from the carburizing treatment which, in addition to being affected by the case carbon content, may vary considerably with the various types of steel.

In Fig. 6 is shown a depth-hardness comparison of the cases produced by carburizing and oil quenching AMS-6250 steel and its alternate AMS-6260. From these curves it is seen that the alternate steel, AMS-6260, shows a somewhat slower carburizing rate than the now-used AMS-6250. The difference in carburizing rates is not altogether desirable but will not cause any important increase in carburizing times in production.

To offset the disadvantage of the alternate steel in its lower carburizing rate it will be seen that a higher surface hardness is made possible by the alternate steel largely because the reduction in nickel and the addition of molybdenum has decreased the austenite retention at the surface. Austenite is a relatively soft constituent in steel which in this case is retained at room temperature through an incomplete hardening reaction in the steel during oil quenching.

Because austenite is soft and ductile, it may easily cause pitting and galling of gears and cams and is therefore highly undesirable.

Of course, in the illustration given in

Fig. 6 the carbon content of the case of the two steels has purposely been made to run high in order to compare austenite retention (high carbon contents increase the tendency toward austenite retention) whereas in production the carbon is controlled to a lower figure. The dotted lines indicate the increase in hardness found when the steels were refrigerated to minus 100 degrees Fahr., under which condition the austenite breaks down, and the hardening reaction is completed. The spread between original and refrigerated hardness curves may be used as a qualitative measure of austenite retention. Since case carbon contents are difficult to control with exactness under production conditions, the decreased tendency of the alternate steels to retain austenite on gear and cam surfaces is highly desirable and important.

**Distortion** in heat treatment, which is an ever-present production hazard especially with aircraft parts involving light and intricate web sections, will probably be about the same with the new steels as with the old as shown by preliminary tests. This property is usually proportional to the hardenability of the steel regardless of composition.

It is believed that in all respects the alternate AMS steels which have been discussed are equal and, in some cases, better than the steels now used in aircraft engines both from the engineering and production standpoints. In addition, as indicated in Table I, the steel compositions required are fewer in number. This allows a welcomed "house cleaning" of carry-over and unnecessary compositions.

## Safety Regulations for Drill Press Operators

"If you don't know the safe way, stop and find out"—that is the introductory line of a small pamphlet embodying twelve regulations for safe operation of drill presses prepared for distribution by foremen to drill-press operators at General Electric's Schenectady works.

The introduction goes on to say—"It's a lot easier to do things right than wrong—and a whole lot safer." One of the regulations aimed specifically at the elimination of one of the most common of industrial accidents among the fair sex, warns girls that "hair nets, snoods, or caps must be worn so that the hair will not catch in spindles or revolving tools." The following should be kept in mind before starting a drill press according to the works' safety committee:

1. If there are red, green, or yellow tags on the machine, do not move the control handle or switch.

2. Use the method prescribed by your


✔ RING

✔ SNAP

✔ FLUSH PIN

✔ BUILD UP

FAST DELIVERY

on these TURNER gauges

✔ RING ✔ FLUSH PIN

✔ SNAP ✔ BUILD UP

EACH TURNER GAUGE BEARS THEIR STAMP OF PRECISION

Again Turner scores a first on the production front—with this announcement on fast delivery of their precision built gauges. These Ring, Snap, Flush Pin and Build Up gauges all bear the Turner Stamp of Precision—your guarantee that they have been carefully inspected and approved according to Turner's high standard of gauge making.

Our new plant is the reason why we can still maintain the highest standards, while increasing our production. It houses the most modern equipment available, and the most experienced men to run it.

Let us fill that rush gauge order. Wire or write us today.

*Wire or Write Your Order Today!*

TURNER BROTHERS

TURNER GAUGE GRINDING COMPANY

2633 HILTON ROAD • • • • FERNDALE, MICH.

IF YOU WANT GAUGES IN A HURRY MAIL THIS TODAY

Turner Gauge Grinding Co.
Ferndale, Michigan

Gentlemen:

Please rush complete information on your ring, flush pin and snap gauges today!

Name _____ Title _____

Address _____

City _____ State _____

All types of Industrial

CARS, TRUCKS & TURNTABLES

We give PROMPT ACTION to your specifications

CALL, WIRE OR WRITE TODAY

Ask us for Suggestions

on any car or truck problem . . . or send your specifications in any form, notes, drawings, etc.

INDUSTRIAL CAR BUILDERS FOR 40 YEARS

CHASE Foundry & Mfg. Co.
COLUMBUS, OHIO

foremen when lifting jig or work to bedplate.

3. Work should be blocked or clamped securely before starting to drill.

4. Remove all drift pins and chuck wrenches before starting spindles.

5. Goggles and safety shoes should be worn to protect against flying chips (eye hazards) and material falling from bedplates (toe hazards).

6. Drill-press operators should not wear finger rings, loose sleeves, neckties, gloves, or wrist watches. Hair nets, snoods, or caps must be worn so that the hair will not catch in spindles or revolving tools.

7. Use proper feeds and speeds.

8. Before attempting to replace a driving belt, be sure the motor is shut off.

*While Press Is in Motion*

9. Keep your drill lubricated. If drill should burn, it might break.

10. If drill sticks in work, do not attempt to start the drill with hand while motor is still running. Shut off the motor first.

11. *Do not use compressed air* unless specifically instructed by foreman. Use a hook, brush, or special tool to remove chips.

*Before Leaving Machine*

12. Be sure that the machine is *shut off* before leaving it.

## How Nazi Cartels Took Over Industrial Power

*Germany's Master Plan: The Story of Industrial Offensive*, by Joseph Borkin, and Charles A. Welsh; published by Duell, Sloan & Pearce, 270 Madison avenue, New York, for $2.75.

The authors occupy positions giving them authoritative standing, Mr. Borkin being economic adviser to the antitrust division of the Department of Justice and Mr. Welsh cartel expert for the Office of Price Administration.

It is not a pretty story of how German cartels laid siege to the economies of their prospective enemies by duping many of their essential industrial enterprises into commercial Munichs.

Winning of the peace is necessary, the authors state, before this insidious weapon of war's most subversive side can be permanently shackled. Forward for the volume is by Thurman Arnold, head of the antitrust division. He characterizes it as "a brilliant and arresting exposition of the results of the disease of cartelization", which he declares responsible for the peace of Munich. Failure to achieve an effective peace will play into the hands of the Nazis, who are planning to win the peace even though they lose the war, the authors say.

# Helpful Literature

## 1. Hardness

Nitralloy Corp.—105-page illustrated booklet, "Hardness", is critical examination of hardness, dynamic hardness and an attempt to reduce hardness to dimensional analysis. Explains theory of French engineer, P. Roudie, who believed that by adopting dynamic method of hardness testing he could define hardness as quantity of energy and, therefore, as function of three fundamental units of mass, length and time.

## 2. Spot Welders

Pier Equipment Manufacturing Co.—4-page illustrated bulletin No. P-50C describes P-50 and P-100 "Peer" air-operated press type combination projection and spot welders. Details of construction and application are included along with chart of welding capacities for different gages of sheet, structural steel wire, rods and nonferrous metals.

## 3. Proportioning Oil Burner

Hauck Manufacturing Co.—16-page illustrated catalog No. 407 is descriptive of "Hauck" proportioning oil burner for precision control of temperature and atmosphere in all heating applications. Moving of single lever automatically controls oil and air supply and simultaneously adjusts both primary and secondary air orifices in burner. Line drawings show construction. Burner capacities and automatic control data are listed.

## 4. Convection Furnace

Hevi Duty Electric Co.—2-page illustrated bulletin No. HD 1041 concerns pit type convection furnace for all operations requiring temperatures up to 1400 degrees Fahr., such as air drawing, heat treatment of aluminum and low temperature annealing. Return-bend heating elements, mounted in radiant plates and held by fluted tee supports, are used in this furnace.

## 5. Crane

Hughes-Keenan Co.—4-page illustrated folder describes "Roustabout" crane for loading, unloading, stacking and moving anything up to 5 tons. Crane is mounted on wheel or crawler tractors and shipped ready to operate. Seven models are available. They vary as to independent or simultaneous operations of load hoisting, boom swing and boom topping operations.

## 6. Packing Boxes

Hinde & Dauch Paper Co.—21-page illustrated booklet, "How To Pack War Materials In Corrugated Shipping Boxes", is sixth in series of "Little Packaging Library" booklets dealing with all phases of corrugated packaging. Shows seventeen different ways in which corrugated box has gone to war.

## 7. Shapers

Ohio Machine Tool Co.—16-page illustrated bulletin No. 59 gives specifications and covers features of "Ohio Dreadnaught" shapers for standard and heavy duty applications, machines ranging in size from 16 to 36 inches. Also described are accessories to be used with these machines.

## 8. Hydraulic Valves

Hanna Engineering Works—6-page illustrated folder on "Unitite" Valves discusses hand and foot operated valves for control of flow in all types of hydraulic systems. Of packless design, these valves are suitable for air, oil or water at pressures up to 250 pounds per square inch. They are made in ⅛, ¼, 1 and 1¼-inch pipe sizes.

## 9. Acidproof Brick & Tile

Harbison-Walker Refractories Co.—6-page illustrated bulletin, "Duro Acidproof Brick and Tile," outlines characteristics, standard and special shapes and typical uses of this material for acid-resistant structures. In addition to brick and tile, packing rings, packing tile and floor construction shapes are shown.

## 10. Hydraulic Cylinders

Hannifin Manufacturing Co.—20-page illustrated bulletin No. 35-B explains design and operation of series N improved high pressure hydraulic cylinders for all classes of hydraulic power applications. Complete specifications and dimensions of these double-acting units are presented. Special types are also covered.

## 11. Tool Grinder

Hammond Machinery Builders, Inc.—8-page illustrated bulletin No. 201 describes complete line of carbide tool grinders. Details are given on combination chip breaker and tool grinder with universal vise, carbide tool grinder, wet or dry tool grinders, and heavy duty grinders. Features of various models are shown.

## 12. Plate Lifting Clamps

Merrill Brothers—6-page illustrated folder offers specifications, capacities and price lists covering line of "Volz" positive plate lifting clamps. Clamps are engineered to lift all types of plates from thin sheets to armor steel. Capacities are rated from ½ to 100 tons. "Pelican" hook turnbuckles are also shown.

## 13. Refractory Lining

Ironton Fire Brick Co.—4-page illustrated folder describes "Caro-Line" one-piece lining for ladles, side blow converters, electric furnace bottoms, rammed cupola linings, cupola breast and slag holes. This highly siliceous refractory material is blended with ceramic minerals to provide uniform bonding qualities.

## 14. Plating Conveyor

Hanson-Van Winkle-Munning Co.—14-page illustrated bulletin SA-101 is descriptive of semi-automatic heavy duty plating conveyor. Also described are various types of drives, wide range of heavy duty carriers and methods of agitation for use in motion plating. Applications of these conveyors to automatic plating equipment are shown.

## 15. Rotary Forging Furnaces

George J. Hagan Co.—4-page illustrated folder describes "Hagan" rotary forging furnaces. Furnaces deliver continuous flow of billets, each heated uniformly from all sides, to prespecified temperature. Other features include accurate heating control and circular hearth construction assuring controlled output in minimum floor space.

## 16. Renovating Worn Pumps

International Nickel Co.—8-page illustrated booklet, "New Parts from Old . . . How to Recondition Worn Pump Shafts and Rods", explains four different methods for renewing worn metal parts such as pump rods and shafts. Procedure is outlined for machining and refinishing worn section, building up and refinishing section by welding, repairing by metal spraying method and rebuilding by electroplating.

## 17. Cold Testing Chambers

Kold-Hold Manufacturing Co.—36-page illustrated catalog No. S-Z 431 covers "Kold-Hold" thermal, sub-zero and stratosphere processing and testing machines. Catalog is divided into two sections. First explains various processes employed in industry in utilizing ranges of temperatures and pressures in work. Second deals with machines manufactured by company for providing these temperature and pressure ranges.

## 18. Drives and Conveyors

Link-Belt Co.—179-page illustrated catalog No. 850 covers line of power transmission and conveying machinery. History of company is outlined. Dimensions, specifications and prices are listed for all standard equipment. Includes such items as chains, sprockets, roller chain drives, couplings, clutches, buckets, spray nozzles and hand winches, car spotters, power shovels, conveyors, speed reducers and bearings.

## 19. Special Steels

W. J. Holliday & Co.—6-page illustrated folder No. 942 discusses composition, characteristics, application, physical properties and heat treatment of "Speed Case" low carbon, open hearth, case carburizing steel and "Speed Treat" medium carbon, open hearth steel.

---

**STEEL** *Readers' Service Dept.*

1213 West Third St., Cleveland, Ohio

4-26-43

Please have literature circled below sent to me.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38 39 40

Name _____ Title _____

Company _____

Products Manufactured _____

Address _____

City _____ State _____

*This card must be completely filled out. Please TYPE or PRINT*

FIRST CLASS
PERMIT No. 58
(Sec. 510 P.L.&R.
Cleveland, Ohio

**BUSINESS REPLY CARD**
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

**STEEL**
Penton Building
CLEVELAND, OHIO
Readers' Service Dept.

## 20. Cold Sawing

Motch & Merryweather Machinery Co.—8-page broadside on "Triple-Chip" method of cold sawing presents details of cold sawing machine, segmental saw blades and automatic saw grinder which are claimed to make possible fast and accurate cutting of machinable types of ferrous and nonferrous materials. High speed segmental saw blades are made in diameters from 22 to 45 inches and in wide range of pitches.

## 21. Spring Washers

National Lock Washer Co.—12-page illustrated bulletin is descriptive of nonferrous "Kantlink" spring washers. Made of "Everdur", "K-Monel" and stainless steel, these units are of non-linking design which prevents tangling and thus facilitates assembly of equipment. Types and sizes are tabulated for practically all applications.

## 22. Die Casting

New Jersey Zinc Co.—24-page illustrated booklet discusses salient features of zinc alloy and method of producing die castings. In question and answer form, die casting process, machines, production rate, alloy compositions, possible shapes, applications, finishes, machinability and other factors are covered.

## 23. Abrasive Products

Norton Co.—84-page illustrated bulletin No. 1508 on "Abrasives and Grinding Wheels" is designed as handbook for grinding apprentices. Grinding and grinding wheels, wheel selection and reference tables, and general grinding information are covered in detail. Plainly written, this manual is practical guide for training and actual grinding operations.

## 24. Women in Industry

Monarch Machine Tool Co.—8-page illustrated bulletin No. 190 is entitled "Women in Production Work." Actual experiences of this company in employing women for production of machine tools are related. Booklet covers work women can do, clothing, foot comfort, wages, effect on morale, suggestions, use of "Dean of Women" and machines which may be operated by women.

## 25. Cranes

Manning Maxwell & Moore, Inc., Shaw-Box Crane division—36-page illustrated catalog No. 214 describes line of multi-motored overhead electric traveling cranes which are available in four types. Two types of cranes are for conditions where standard overhead clearance conditions prevail and two are for conditions where overhead space is limited, necessitating maximum hook lifts and approaches.

## 26. Roller Chain & Sprockets

Diamond Chain & Manufacturing Co.—32-page illustrated engineering data book No. 643 gives specifications and application information on precision roller chains and sprockets for aircraft. In addition to presenting details of various types of standard and special units, data are included to aid in selection of chains, calculating their length and other engineering information.

## 27. Magnetic Inspection

Magnaflux Corp.—8-page illustrated bulletin No. 413 is descriptive of "Magnaflux" magnetic particle inspection methods for determining flaws in both ferrous and nonferrous products. Function of method is explained and typical applications in steel mills, foundries, forge shops, weld shops, heat treating and grinding are listed.

## 28. Copper Alloys

Revere Copper & Brass Inc.—44-page illustrated bulletin, "Revere Copper and Copper Alloys for Mechanical Industries Engaged in War Work," gives complete technical and production data on copper, brasses, bronzes, cupronickel and nickel-silver alloys. General, physical and working properties, as well as specifications and applications are given for each. Available forms are covered.

## 29. Gears

Philadelphia Gear Works—72-page illustrated catalog No. 42 is data book on gears. In addition to presenting engineering information and tables of dimensions for various types of gears, it also contains data on speed reducing units, "MotoReduceRe" and electric hoists. Herringbone, spiral, worm, bevel and miter, helical and spur gears are covered.

## 30. Aircraft Alloy Steels

Joseph T. Ryerson & Son, Inc.—32-page illustrated combination stock list and reference data book is entitled, "Aircraft Alloy Steels." Available to buyers and technical men in aircraft and aircraft parts manufacturing industries, booklet is guide to stocks, prices, sales limitations and specifications. It contains condensed version of various specifications of steel for aircraft use.

## 31. Stainless Fabrication

Oakite Products, Inc.—3-page special service report, "The Fabrication and Surface Treatment of Stainless Steels," discusses machining, grinding, drawing, forming, degreasing and descaling operations. Solutions to be used and procedures are outlined for each of these operations.

## 32. Lubricants & Coolants

Pennzoil Co.—4-page illustrated bulletin, "Machine Tools," describes various types of lubricating oils, hydraulic oils, coolants and cutting oils for industrial applications. In addition to covering characteristics of oils, typical applications to machines and processes are shown.

## 33. Electric Furnaces

Hydro-Arc Furnace Corp—8-page illustrated bulletin No. 100 is entitled, "Important Developments in Electric Arc Melting Furnaces." Details are given on design and operation of hydraulic electrode positioning mechanism, well-cooled power operated electrode clamps, water-cooled doors and top charging feature. Furnaces are available with melting capacities ranging from 250 to 12,000 pounds per hour.

## 34. Welding Positioner

Lyon-Raymond Corp.—4-page illustrated bulletin No. 131 describes design, operation and applications of hydraulically operated welding positioner which tilts 90 degrees, lifts 14 inches and revolves 360 degrees so that weldments can be handled for maximum production. Capacity is 200 pounds. Also covered are hydraulic elevating welding tables.

## 35. Electric Control

Leeds & Northrup Co.—80-page illustrated catalog No. N-00-A explains functioning and application of "Micromax" indicating, and indicating and recording controllers. Devices apply balance principle to both measurement and control. Typical controller layouts are shown.

## 36. Die Steel

Jessop Steel Co.—8-page illustrated booklet No. 542 gives characteristics, applications, working data and analysis of "Truform" oil hardening nonshrinkable die steel. Claimed characteristics of this material are nonshrinkability, hardness, toughness and machinability. Forging, annealing, hardening and drawing instructions are outlined.

## 37. Tempering Furnace

Johnson Gas Appliance Co.—4-page illustrated folder, "Here It Is," gives complete description and specifications on No. 820 tempering and drawing furnace. This unit is designed to facilitate tempering of tools, dies, small parts, nonferrous castings and parts, and aluminum forgings and rivets. Other types of heat treating furnaces are briefly described.

## 38. Optical Comparators

Jones & Lamson Machine Co.—20-page illustrated bulletin No. 431 discusses design and operation of optical comparators and their use for measurement of tools and gages, as well as inspection of production parts by comparison of part with master template or outline. In addition to showing typical parts which can be checked, various types of optical comparators are shown.

## 39. Arc Welding

Harnischfeger Corp.—9-page illustrated bulletin No. W-20, by F. J. Hirner, outlines modern goal in equipment design and welding technique. Points out need for greater efficiency in predetermining results in finished welds, and for minimizing dependency upon human element in applying process. Simplification of design, control and application of welders and electrodes is seen as channel for continued advancement.

## 40. Grinding Wheels

Macklin Co.—64-page illustrated booklet, "Helpful Hints and Safety Suggestions," contains pertinent facts regarding application, selection and maintenance of grinding wheels in all types of machines. Precautionary steps are outlined to assure maximum production and better finishes. Recommendations for wheel selection for various types of work are covered.

---

**STEEL** *Readers' Service Dept.*

1213 West Third St. Cleveland, Ohio

4-26-43

Please have literature circled below sent to me.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29
30 31 32 33 34 35 36 37 38 39 40

Name _____ Title _____

Company _____

Products Manufactured _____

Address _____

City _____ State _____

*This card must be completely filled out. Please TYPE or PRINT*

FIRST CLASS
PERMIT No. 66
(Sec. 510 P.L.&R.
Cleveland, Ohio

**BUSINESS REPLY CARD**
No Postage Stamp Necessary if Mailed in the United States

4c POSTAGE WILL BE PAID BY—

**STEEL**
Penton Building
CLEVELAND, OHIO
Readers' Service Dept.

## Warehouse Association's Chapters Elect Officers

Chapters of the American Steel Warehouse Association, Cleveland, have elected officers for the coming year as follows:

**Baltimore:** President, Harold Dell, John J. Greer & Co. Inc., Baltimore; vice president, W. P. Wetherall, William G. Wetherall, Baltimore; secretary, J. D. Boan, United States Steel Supply Co., Baltimore; chapter director, George J. Parke, Eagleston-Parke Inc., Norfolk, Va.

**Buffalo:** President, J. P. Comer, Dobbie Foundry & Machine Co., Niagara Falls, N. Y.; vice president, Edward J. Wichter, Edgar T. Ward's Sons Co., Buffalo; secretary-treasurer, Leslie N. Stetson, Peter A. Frasse & Co. Inc., Buffalo; chapter director, J. Frederick Rogers, Beals, McCarthy & Rogers Inc., Buffalo.

**Cincinnati:** President, L. E. Dallas, Peninsular Steel Co., Dayton, O.; vice presidents, A. A. Hupp, Central Steel & Wire Co., Cincinnati, and D. L. McCubbin, Joseph T. Ryerson & Son Inc., Cincinnati; secretary, Fred W. Solarek, Central Steel & Wire Co., Dayton, O.; treasurer, J. E. Merchant, Edgar T. Ward's Sons Co., Cincinnati; chapter director, J. A. Thiele, Miami-Dickerson Steel Co., Dayton, O.

**Connecticut:** President, R. B. Shearer, C. S. Mersick & Co., New Haven, Conn.; vice president, S. H. Hascall, Blodgett & Clapp Co., Hartford, Conn.; secretary-treasurer, G. S. Brousso, C. S. Mersick & Co., New Haven, Conn.; chapter director, Mr. Shearer.

**Detroit:** President, E. W. Lynch, Union Drawn Steel Division, Republic Steel Corp.; secretary-treasurer, J. Ivan Fiscus, Huron Steel Co. Inc.; chapter director, L. S. Roehm, Jones & Laughlin Steel Corp., all of Detroit.

**New England:** President, Quincy W. Wales, Brown-Wales Co., Boston; vice presidents, Murray C. Harvey, A. C. Harvey Co., Allston, Mass., and G. A. Putnam, George F. Blake Inc., Worcester, Mass.; secretary-treasurer, Carrel S. Harvey, A. C. Harvey Co., Allston, Mass.; chapter director, G. M. Congdon, Congdon & Carpenter Co., Providence, R. I.

**Northern California:** President, Howard M. Tayler, Tayler & Spotswood Co., San Francisco; vice presidents, J. C. Hickinbotham, Hickinbotham Bros., Stockton, Calif., and Curtiss Hayden, Dunham-Carrigan & Hayden Co., San Francisco; secretary, R. D. Cortelyou, 415 Rialto building, San Francisco; chapter director, Mr. Tayler.

**Northern Ohio:** President, Harry K. Hamilton, Hamilton Steel Co., Cleveland; vice president, J. J. Halloran, Edgar T. Ward's Sons Co., Cleveland; secretary-treasurer, R. J. Foster, Republic Structural Iron Works, Cleveland; chapter director, R. M. Beutel, Paterson-Leitch Co., Cleveland.

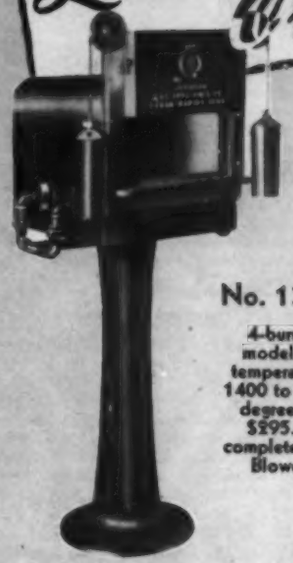
**Pacific Northwest:** President, S. F. Woodbury, Woodbury & Co., Portland, Oreg.; vice president, John B. Robbins, A. M. Castle & Co., Seattle; secretary-treasurer, H. F. Morrow, Pacific Metal Co., Portland, Oreg.; chapter director, R. P. Mercer, Jacobs & Gile Inc., Portland, Oreg.

**Pittsburgh:** President, J. H. Fogwell, United States Steel Supply Co., Pittsburgh; vice president, J. M. Hilbish, Jones & Laughlin Steel Corp., Pittsburgh; secretary, T. L. Lawry, Steel Products Co., McKees Rocks, Pa.; treasurer, F. B. Lorenz, Edgar T. Ward's Sons Co., Pittsburgh; chapter director, A. W. Herron, Jones & Laughlin Steel Corp., Pittsburgh.

**Southern:** President, Frank Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn.; vice president, L. H. Krieger, Jones & Laughlin Steel Corp., New Orleans; secretary-treasurer, George W. Smith, Southern Steel Co., Birmingham, Ala.; chapter director, Phil Pidgeon, Pidgeon-Thomas Iron Co., Memphis, Tenn.

**Southern California:** President, E. Jungquist, Percival Steel & Supply Co., Los Angeles; vice presidents, J. L. Robertson, A. M. Castle & Co., Los Angeles, and Wayne Rising, Ducommun Metals & Supply Co., Los Angeles; secretary-treasurer, L. B. Yeaton, Earle M. Jorgensen


*When you need* 2 WEEKS' DELIVERY *Order..* JOHNSON FURNACES



No. 130A
4-burner model for temperatures 1400 to 2000 degrees F. $295.00 complete with Blower.

No. 130
Firebox 5½ inches high, 13 inches wide, 13½ inches long $248.00

No. 120
Firebox 5 inches high, 7¾ inches wide, 13½ inches long $129.50

Save Time — Speed Production, Order Johnson Furnaces — Delivered in Just 2 Weeks!

**Johnson No. 130A Heat-Treating Furnace**

For quick, accurate heat-treating of hi-speed steels. Counter-balanced door opens upward, so tools can be put in or removed without fully opening door — preventing temperature drops. Carbofrax hearth and ¼ H.P. blower. Lined with hi-temperature insulation. Firebox: 7¾ inches high, 13 inches wide, 16½ inches long. 6-burner job — $325.00 for 1800 to 2400 degrees F.

**Johnson No. 130 Furnace for Heat-Treating**

Four correctly placed burners in No. 130 produce high and accurate temperatures for heat-treating hi-speed steels, for hardening punches, dies and tools. Heavily lined with hi-temperature insulating refractory, and equipped with blower and G.E. motor. Reaches 2300 degrees F. in just 22 minutes.

**Johnson No. 120 Furnace for Speedy Heat-Treating**

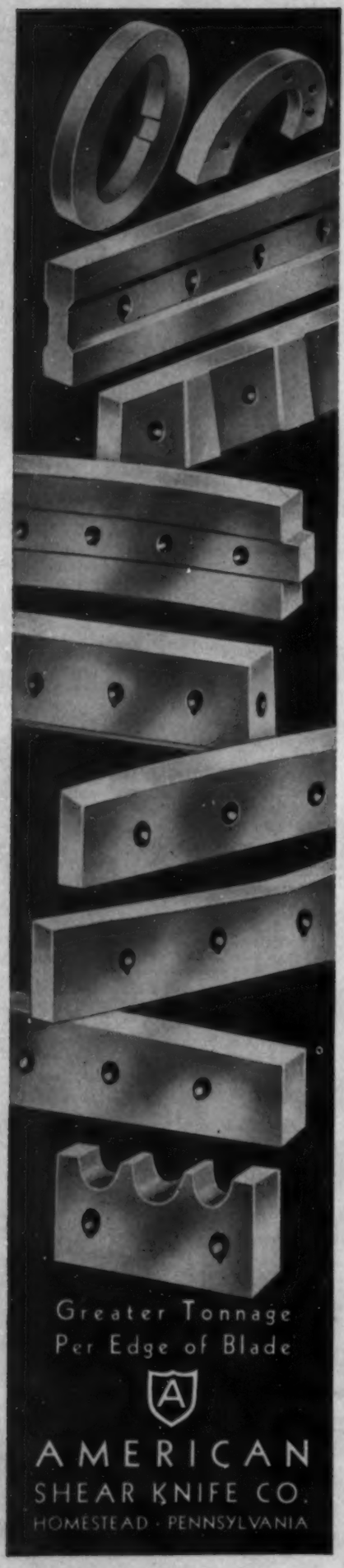
This unit is especially designed for heat-treating, but is also exceptionally good for hardening tools, dies and punches. Equipped with G.E. motor and Johnson Blower. Heavily lined with insulating refractory. Carbofrax hearth. Easy temperature regulation with air and gas adjustment.

*All Prices F.O.B. Factory*

Offices in All Principal Cities

Johnson Gas Appliance Co.
591 E Ave., N. W.
Cedar Rapids, Iowa
Yes, send me a copy of your new Free catalog.

Name _____
Address _____ State _____
City _____




Co., Los Angeles; chapter director, Mr. Jungquist.

## WPB Appoints Committees

New government committees recently appointed by the War Production Board are as follows:

**Commercial Drop Forgings**

Government presiding officer is G. F. Hocker. Committee members: A. D. Armitage, J. H. Williams Co., Buffalo; R. G. Carrier, Federal Drop Forge Co., Lansing, Mich.; James A. Cook, Standard Forgings Co., Chicago; Edwin Hodge Jr., Pittsburgh Forgings Co., Coraopolis, Pa.; J. F. Rice, Drop Dies & Forgings Co., Cleveland; R. R. Smith, Milwaukee Forge & Machine Co., Milwaukee; Harry G. Stoddard, Wyman-Gordon Co., Worcester, Mass.; C. E. Stone, Interstate Drop Forge Co., Milwaukee.

**Barn and Barnyard Equipment**

Government presiding officer is James W. Crofoot. Committee members: David J. Gemmell, Cleveland Chain & Mfg. Co., Cleveland; J. A. Gray, Harry J. Simons Lumber & Mfg. Co., St. Paul; A. Gutenkunst Jr., Milwaukee Hay Tool Co., Milwaukee; R. C. Hudson, H. D. Hudson Mfg. Co., Chicago; R. W. Louden, Louden Machinery Co., Fairfield, Iowa; Stephen Mahon, James Mfg. Co., Fort Atkinson, Wis.; H. B. Megram, Starline Inc., Harvard, Ill.; D. D. Miller III, Ney Mfg. Co., Canton, O.; C. D. Leiter, F. E. Myers & Brother Co., Ashland, O.

**Poultry Equipment**

Government presiding officer is James W. Crofoot. Committee members: L. J. Brower, Brower Mfg. Co., Quincy, Ill.; A. R. Hill, The Buckeye Incubator Co., Springfield, O.; S. H. Smith, Smith Tool & Engineering Co., Bucyrus, O.; Howard S. Smith, Trumbull Electric Mfg. Co., Plainville, Conn.; R. C. Hudson, H. D. Hudson Mfg. Co., Chicago; Stephen Mahon, James Mfg. Co., Fort Atkinson, Wis.; Arthur Scott, Beacon Steel Products Co., Westminster, Md.; D. B. Tolley, Makomb Steel Products Co., Macomb, Ill.; A. R. Wood, A. R. Wood Mfg. Co. Inc., Santa Cruz, Calif.; W. A. Zaloudek, Oakes Mfg. Co. Inc., Tipton, Ind.

**Hand Hair Clippers**

Government presiding officer is Anthony Bisgood. Committee members: P. R. Hatch, Brown & Sharpe Mfg. Co., Providence, R. I.; John Oster, John Oster Mfg. Co., Racine, Wis.; G. J. Michel, H. Boker & Co. Inc., New York; Julius Schultz, Allover Mfg. Co., Racine, Wis.

**Farm Elevators and Blowers**

Government presiding officer is K. W. Anderson. Committee members: J. W. Coxon, Portable Elevator Mfg. Co., Bloomington, Ill.; V. P. Diedrich, Owatonna Mfg. Co., Owatonna, Minn.; S. D. Getz, The Meyer Mfg. Co., Morton, Ill.; C. E. Redborn, U. S. Wind Engine & Pump Co., Batavia, Ill.; Frank Silloway, Deere & Co., Moline, Ill.; H. C. Wallace, Link Mfg. Co., Fargo, N. D.; L. J. Peterson, Farm Equipment Division, Stainless & Steel Products Co., St. Paul, Minn.

**Wheelbarrows**

Government presiding officer is Roy Halquist. Committee members: J. A. Anderson, Toledo Wheelbarrow Co., Toledo, O.; G. W. Atkins, Buch Mfg. Co., Elizabethtown, Pa.; J. E. Core, Jackson Mfg. Co., Harrisburg, Pa.; Floyd Evans, Slusser McLean Scraper Co., Sidney, O.; R. T. Faucett, Chattanooga Wheelbarrow Co., Chattanooga, Tenn.; H. C. Hoeflich, Case, Crane & Kilbourne Jacobs Co., Columbus, O.; L. S. Holden, Construction Machinery Co., Waterloo, Iowa; C. C. Keller, General Wheelbarrow Co., Cleveland; S. E. Race, Lansing Co., Lansing, Mich.; W. H. C. Goode, American Steel Scraper Co., Sidney, O.; J. T. Hegner, Sterling Wheelbarrow Co., Milwaukee.

**Office Machinery**

Government presiding officer is N. G. Burleigh. Committee members: Stanley C. Allyn,

ON TIME!
We are fully aware of the importance of "time table deliveries" in war production. Many of America's leading manufacturers entrust their precision tool problems to us because they have confidence in the accuracy of our work as well as the promptness of our service.
PRECISION TOOL MAKERS
THE ELIOTT Manufacturing Co.
MILFORD, CONNECTICUT

*All*
**SMALL PARTS YOU NEED FROM THIS** *Single* **SOURCE**

*Centralize* your sources and SAVE TIME. Above diagrams typify the variety of Fuse Pins and Discs—Shear Pins—Retaining Pins—Setting Pins—Firing Pins—Swivel Locks—Threaded Hooks—Wing Nuts—U-Bolts—special and standard Screws, Bolts, Nuts and Rivets obtainable at Central Screw Company for:

- Communication Units • Hose Clamps
- Electrical Controls • Bomb Releases
- Aircraft Components • Ordnance Items
- Ammunition Boxes • Marine Equipment

**SPEED YOUR PRODUCTION!**

If you need small parts for Bombs—Bomb Releases—Fuses—Ammunition Boxes—Communication Units—Electrical Controls—Aircraft Components—Hose Clamps—Ordnance Items—Marine Equipment—we'll deliver *any* quantity, with absolute *uniformity* of size, shape, and quality, *when* you need them. Write

**CENTRAL**
**SCREW COMPANY**
**3517 Shields Ave. Chicago, Ill.**

The National Cash Register Co., Dayton, O.; Laurence V. Britt, Burroughs Adding Machine Co., Detroit; W. D. Caton, Standard Register Co., Dayton, O.; A. B. Dick Jr., A. B. Dick Co., Chicago; H. P. Elliott, Elliott Addressing Machine Co., Cambridge, Mass.; Carl M. Friden, Friden Calculating Machine Co. Inc., San Leandro, Calif.; Joseph E. Rogers, Addressograph Multigraph Corp., Cleveland; Merrill B. Sands, Dictaphone Corp., New York; Walter L. Todd, Todd Co., Rochester, N. Y.; A. W. Vanderhoof, Standard Duplicating Machine Corp., Everett, Mass.; Curtis G. Watkins, Simplex Time Recording Co., Gardner, Mass.; Thomas J. Watson, International Business Machines Corp., New York.

#### Industrial Rotary Brush

Government presiding officer is Philip H. Thayer. Committee members: R. H. Daniels, S. A. Felton & Son Co., Manchester, N. H.; Alonzo G. Decker Jr., The Black & Decker Mfg. Co., Towson, Md.; Samuel F. Dixon, Wm. Dixon Inc., Newark, N. J.; Norman F. Smith, Osborn Mfg. Co., Cleveland; J. E. Stellwagon, Newark Brush Co., Kenilworth, N. J.; E. F. Streich Jr., The Milwaukee Brush Mfg. Co., Milwaukee; Louis M. Hague, Hanson-Van Winkle-Munning Co., Matawan, N. J.; Louis P. Mahler, P. Mahler & Sons, New York; Wm. F. McDermott, Woonsocket Brush Co., Woonsocket, R. I.; V. F. Spindler, W. G. Spindler & Sons, Trenton, N. J.; A. H. White, White Products Co., Baldwin, Long Island, N. Y.; F. A. Mettee, Pittsburgh Plate Glass Co., Baltimore.

#### Adding Machines

Government presiding officer is N. G. Burleigh. Committee members: William F. Arnold, Underwood Elliott Fisher Co., New York; Laurence V. Britt, Burroughs Adding Machine Co., Detroit; Victor H. Davidson, L. C. Smith & Corona Typewriters Inc., Syracuse, N. Y.; Samuel Karasick, Swift Business Machines Corp., Great Barrington, Mass.; Frank J. Roderick, Lanston Monotype Machine Co., Philadelphia; M. S. Bandoli, Victor Adding Machine Co., Chicago; E. F. Britten Jr., Monroe Calculating Machine Co., Orange, N. J.; H. A. Hicks, Remington-Rand Inc., Buffalo, N. Y.; W. J. Pickering, Allen Wales Adding Machine Corp., New York; M. T. Snyder, Allen Calculators Inc., Grand Rapids, Mich.

#### Gear and Speed Reducer

Government presiding officer is R. C. Sollenberger. Committee members: Russell C. Ball, Philadelphia Gear Works, Philadelphia; Thomas I. Barnaby, Western Gear Works, Seattle; Louis R. Botsai, Westinghouse Electric & Mfg. Co., Pittsburgh; Howard Dingle, Cleveland Worm & Gear Co., Cleveland; I. E. McBride, Palmer-Bee Co., Detroit; Robert B. Moir, Foote Bros. Gear & Machine Co., Chicago; H. Browning, The Ohio Gear Co., Cleveland; Rodney Davis, Rodney Davis & Co., Philadelphia; D. W. Diefendorf, Diefendorf Gear Corp., Syracuse, N. Y.; C. J. Morrin, Boston Gear Works, North Quincy, Mass.; T. W. Scannell, The Falk Corp., Milwaukee; B. B. Tripp, Ohio Forge & Machine Corp., Cleveland.

#### Lead Pigments

Government presiding officer is Wells Martin. Committee members: S. B. Coolidge Jr., Sherwin-Williams Co., Cleveland; F. H. Hurless, International Smelting & Refining Co., East Chicago, Ill.; John R. MacGregor, John R. MacGregor Lead Co., Chicago; H. Rowe, National Lead Co., New York; P. E. Sorague, The Glidden Co., Cleveland; W. Wilke Jr., Hammond Lead Products Co., Hammond, Ind.; Miles M. Zoller, Eagle Picher Lead Co., Cincinnati.

## Algoma Products Formed for Large Scale Die Manufacturing

Algoma Products, Detroit, has been formed for large scale manufacture of template dies and fixtures for aircraft and other industries, L. Hoster, general manager, announced . Former plant of Weltronic Corp., 3080 E. Outer Drive, has been taken over to provide additional space and facilities. Company's new method of producing dies reduces costs by 65 per cent and is four times as rapid.

**WOOD OR METAL**
**PATTERNS**
★
**NON-FERROUS**
**CASTINGS**
TO YOUR EXACT
*Specifications*

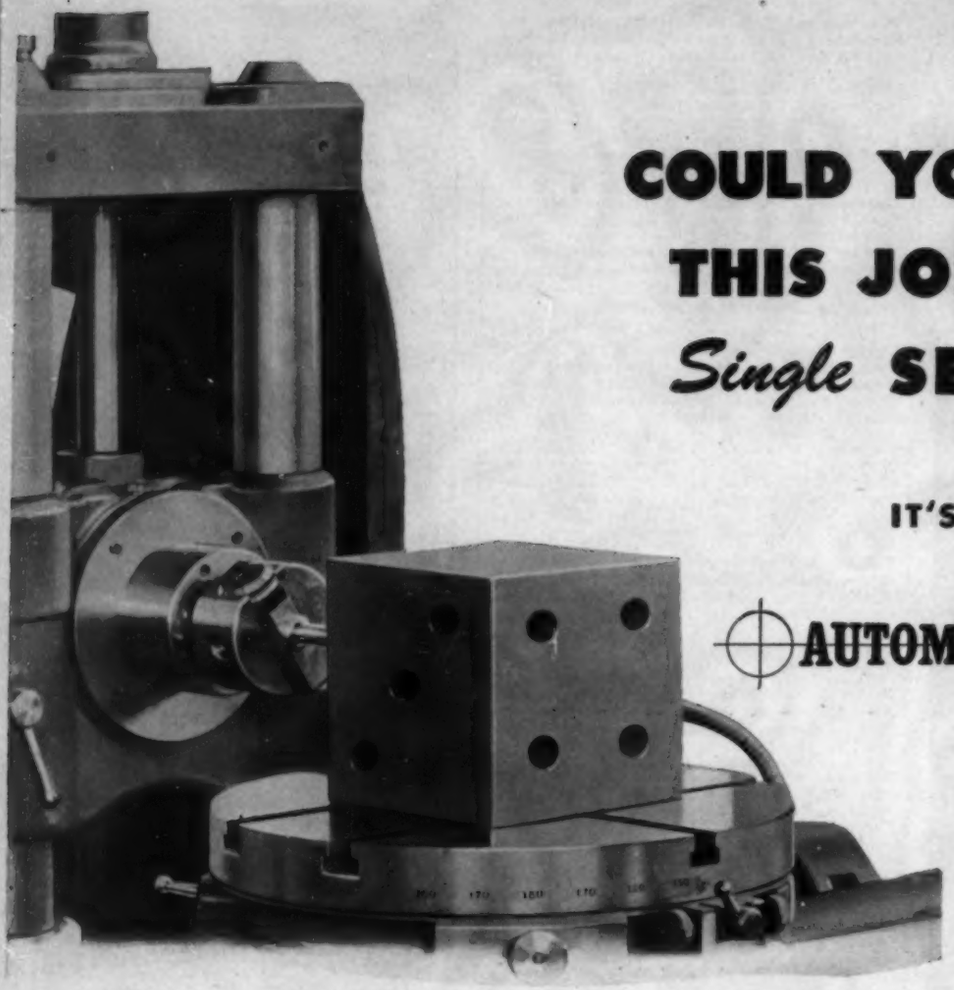
★ Extra operations and unnecessary loss of time can be avoided by sending your order to Wellman. Here patterns are made and castings produced to the exact specifications of customer's blueprint.

We make patterns of any size, kind and design for use in our own or outside foundry.

Castings produced in Ampco Bronze, Dowmetal (magnesium), Wellcast Brass and Bronze and Aluminum Alloys.

**THE WELLMAN BRONZE & ALUMINUM COMPANY**
General Offices
2539 E. 93rd Street • Cleveland, Ohio

*Wellman*
*MEANS WELL-CAST*



# COULD YOU BORE THIS JOB IN A *Single* SET-UP?

IT'S A *"Natural"* WITH THE AUTOMETRIC MODEL B

The illustration shows a typical time-saving operation on the Autometric Model B. All of the holes in all four sides or at various angles in a box jig or production part are produced with one clamping of the work piece.

Its ability to handle a complete job in a single set-up—more rapidly and accurately than ever before—makes the Autometric Model B indispensable equipment for the precision boring of a wide variety of parts.

**Model B Autometric Features:**

- Errorless measuring — more rapidly, more accurately — by the Autometric method.
- Infinite variation of spindle speeds by finger tip control.
- Infinite selection of feeds by finger tip control.
- Hardened — ground — and super-finished steel ways.

*Write for complete information on the Model B Autometric Jig-Boring Machine.*

*Buy Victory . . .*
WITH AT LEAST 10% IN WAR BONDS

Rotary Head Milling Machine
•
Autometric Jig Borers
•
Center Scope

**Kearney & Trecker** *Products*
CORPORATION
Milwaukee, Wisconsin
Subsidiary of Kearney & Trecker Corporation

Milwaukee Face Mill Grinder
•
Milwaukee Midgetmill
•
Milwaukee Speedmill

# Steel Consumers Are Covering Further Ahead

***CMP allotment numbers being filed more rapidly. . . Deliveries being pushed further ahead as backlogs grow. . . Pig iron situation easier as production sets new record***

**DEMAND**
*Essential needs press capacity.*

**PRODUCTION**
*Steady at 99 per cent.*

**PRICES**
*Unchanged at ceilings.*

BECAUSE scheduling of steel orders for rolling by mills no longer depends on Production Requirements Plan ratings, but on date of receipt of CMP allotment numbers, buyers are moving with increased celerity in getting CMP orders through as promptly as possible.

As a result many are ordering further ahead than previously as they realize that after June 30, when CMP becomes fully effective, allotment numbers will be the only factor, short of special directives. Apparently tonnage for delivery beyond the end of second quarter is being certified more promptly in the case of some claimant agencies than others, in the experience of some sellers of diversified products. As numerous factors may distort this picture opinion is that it is too early to know whether special measures will be necessary later to bring proper balance.

Major producers now are largely covered for the remainder of second quarter with a rapidly growing backlog for delivery beyond. One seller of hot and cold-rolled sheets is booked up almost solidly until August. Galvanized sheet producers, however, have some tonnage available for June. Shape sellers also are able to make June deliveries, but considering the dearth of building construction even that delay is surprising. Limitation of steel for rolling structurals probably is the cause.

. . .

It is practically impossible to obtain promise of delivery of any specification of steel bars before July and on larger rounds before August or September. Alloy bars are still further delayed. Forging billets are difficult to obtain before September and in some cases little can be promised before October.

Slight changes in active steelmaking furnaces, some being taken off for repair and others relighted after reconditioning, failed to alter the production rate last week, which remained at 99 per cent of capacity. Buffalo advanced 2½ points to 93 per cent, Cleveland 3 points to 95 and Cincinnati 4 points to 97 per cent. Chicago declined 2 points to 98½ per cent, New England 5 points to 95, Wheeling 4½ points to 88½ and Youngstown 2 points to 95 per cent. Rates were held unchanged at Pittsburgh, 98½ per cent; St. Louis, 93; Birmingham, 100; eastern Pennsylvania, 94; Detroit, 96.

Scrap yard operators continue to have difficulty obtaining sufficient labor to prepare their collections. Permission to increase wages has been granted in some cases but this has not solved the problem. Some operators are considering going out of business as circumstances have reduced their profits to the vanishing point. Currently supplies are sufficient but complaint is made of quality of much of the material, which causes loss in off-heats. Efforts to uncover scrap from dormant sources are being continued and automobile wreckers keep up their contributions as rapidly as old cars are available. Continued unfavorable weather is holding back the usual spring increase in country collections.

An easier situation prevails in the pig iron market, burden on some foundries engaged in war work being slightly eased by changes in the nature of armament demand and requirements for machine tool builders declining as equipment needs slacken. Expected relining needs have forced several stacks down and this has changed the picture in allocations, many melters being supplied from unusual sources. Much of the slack caused by changes in demand for war materials is taken up by increased needs of foundries supplying the agricultural and railroad car industries.

. . .

Pig iron production in March set a new all-time record with 5,314,201 net tons, 77,593 tons greater than the previous mark of 5,236,608 tons made in October, 1942. For first quarter total output was 15,290,952 tons, compared with 14,527,626 tons in the corresponding period last year. Production in March was at 98.7 per cent of capacity, some districts producing at more than rated capacity.

Blast furnaces in March consumed 7,723,461 gross tons of Lake Superior iron ore, slightly less than the record consumption of 7,765,174 tons in January. One less blast furnace was in operation than in January. Ore at furnaces and on Lake Erie docks April 1 was 25,088,209 tons, compared with 20,189,294 tons a year ago. Eight blast furnace stacks are idle in the United States but all Canadian furnaces are blowing.

Average composite prices of steel and iron products continue unchanged, finished steel at $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

# COMPOSITE MARKET AVERAGES

| | Apr. 24 | Apr. 17 | Apr. 10 | One Month Ago Mar., 1943 | Three Months Ago Jan., 1943 | One Year Ago Apr., 1942 | Five Years Ago Apr., 1938 |
|---|---|---|---|---|---|---|---|
| Finished Steel | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $56.73 | $62.00 |
| Semifinished Steel | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 36.00 | 40.00 |
| Steelmaking Pig Iron | 23.05 | 23.05 | 23.05 | 23.05 | 23.05 | 23.05 | 23.02 |
| Steelmaking Scrap | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 19.17 | 12.60 |

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

# COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

## Finished Material

| | April 24 1943 | March 1943 | Jan. 1943 | April, 1942 |
|---|---|---|---|---|
| Steel bars, Pittsburgh | 2.15c | 2.15c | 2.15c | 2.15c |
| Steel bars, Chicago | 2.15 | 2.15 | 2.15 | 2.15 |
| Steel bars, Philadelphia | 2.49 | 2.49 | 2.49 | 2.49 |
| Shapes, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Shapes, Philadelphia | 2.22 | 2.22 | 2.22 | 2.22 |
| Shapes, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Plates, Philadelphia | 2.15 | 2.15 | 2.15 | 2.15 |
| Plates, Chicago | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, hot-rolled, Pittsburgh | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, cold-rolled, Pittsburgh | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Pittsburgh | 3.50 | 3.50 | 3.50 | 3.50 |
| Sheets, hot-rolled, Gary | 2.10 | 2.10 | 2.10 | 2.10 |
| Sheets, cold-rolled, Gary | 3.05 | 3.05 | 3.05 | 3.05 |
| Sheets, No. 24 galv., Gary | 3.50 | 3.50 | 3.50 | 3.50 |
| Bright bess., basic wire, Pittsburgh | 2.60 | 2.60 | 2.60 | 2.60 |
| Tin plate, per base box, Pittsburgh | $5.00 | $5.00 | $5.00 | $5.00 |
| Wire nails, Pittsburgh | 2.55 | 2.55 | 2.55 | 2.55 |

## Semifinished Material

| | | | | |
|---|---|---|---|---|
| Sheet bars, Pittsburgh, Chicago | $34.00 | $34.00 | $34.00 | $34.00 |
| Slabs, Pittsburgh, Chicago | 34.00 | 34.00 | 34.00 | 34.00 |
| Rerolling billets, Pittsburgh | 34.00 | 34.00 | 34.00 | 34.00 |
| Wire rods No. 5 to $\frac{9}{32}$-inch, Pitts. | 2.00 | 2.00 | 2.00 | 2.00 |

## Pig Iron

| | April 24 1943 | March 1943 | Jan. 1943 | April, 1942 |
|---|---|---|---|---|
| Bessemer, del. Pittsburgh | $25.19 | $25.19 | $25.19 | $25.19 |
| Basic, Valley | 23.50 | 23.50 | 23.50 | 23.50 |
| Basic, eastern, del. Philadelphia | 25.39 | 25.39 | 25.39 | 25.39 |
| No. 2 fdry., del. Pgh., N.&S. Sides | 24.69 | 24.69 | 24.69 | 24.69 |
| No. 2 foundry, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| Southern No. 2, Birmingham | 20.38 | 20.38 | 20.38 | 20.38 |
| Southern No. 2, del. Cincinnati | 24.30 | 24.30 | 24.30 | 24.06 |
| No. 2X, del. Phila. (differ. av.) | 26.265 | 26.265 | 26.265 | 26.265 |
| Malleable, Valley | 24.00 | 24.00 | 24.00 | 24.00 |
| Malleable, Chicago | 24.00 | 24.00 | 24.00 | 24.00 |
| Lake Sup., charcoal, del. Chicago | 31.54 | 31.54 | 31.54 | 31.54 |
| Gray forge, del. Pittsburgh | 24.19 | 24.19 | 24.19 | 24.19 |
| Ferromanganese, del. Pittsburgh | 140.65 | 140.65 | 140.65 | 125.63 |

## Scrap

| | | | | |
|---|---|---|---|---|
| Heavy melting steel, Pittsburgh | $20.00 | $20.00 | $20.00 | $20.00 |
| Heavy melt. steel, No. 2, E. Pa. | 18.75 | 18.75 | 18.75 | 18.75 |
| Heavy melting steel, Chicago | 18.75 | 18.75 | 18.75 | 18.75 |
| Rails for rolling, Chicago | 22.25 | 22.25 | 22.25 | 22.25 |
| No. 1 cast, Chicago | 20.00 | 20.00 | 20.00 | 20.00 |

## Coke

| | | | | |
|---|---|---|---|---|
| Connellsville, furnace, ovens | $6.50 | $6.50 | $6.00 | $6.00 |
| Connellsville, foundry, ovens | 7.75 | 7.75 | 7.25 | 7.25 |
| Chicago, by-product fdry., del. | 12.25 | 12.25 | 12.25 | 12.25 |

## STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

### Semifinished Steel

**Gross ton basis except wire rods, skelp.**

**Carbon Steel Ingots:** F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

**Alloy Steel Ingots:** Pittsburgh, uncropped, $45.00.

**Rerolling Billets, Slabs:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

**Forging Quality Billets:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

**Open Hearth Shell Steel:** Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

**Alloy Billets, Slabs, Blooms:** Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

**Sheet Bars:** Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

**Skelp:** Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

**Wire Rods:** Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10; Galveston, $0.27. Pacific Coast $0.50 on water shipment.

### Bars

**Hot-Rolled Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.80c. (Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points. Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

**Rail Steel Bars:** Same prices as for hot-rolled carbon bars except base is 5 tons.

(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

**Hot-Rolled Alloy Bars:** Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.

(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

| AISI Series | (*Basic O-H) | AISI Series | (*Basic O-H) |
|---|---|---|---|
| 1300 | $0.10 | 4100 (.15-.25 Mo) | 0.55 |
| | | (.20-.30 Mo) | 0.60 |
| 2300 | 1.70 | 4340 | 1.70 |
| 2500 | 2.55 | 4600 | 1.20 |
| 3000 | 0.50 | 4800 | 2.15 |
| 3100 | 0.70 | 5100 | 0.35 |
| 3200 | 1.35 | 5130 or 5152 | 0.45 |
| 3400 | 3.20 | 6120 or 6152 | 0.95 |
| 4000 | 0.45-0.55 | 6145 or 6150 | 1.20 |

*Add 0.25 for acid open-hearth; 0.50 electric.

**Cold-Finished Carbon Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

**Cold-Finished Alloy Bars:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

**Turned, Ground Shafting:** Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

**Reinforcing Bars (New Billet):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.

**Reinforcing Bars (Rail Steel):** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

**Iron Bars:** Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

### Sheets, Strip

**Hot-Rolled Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

**Cold-Rolled Sheets:** Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

**Galvanized Sheets, No. 24:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

**Corrugated Galv. Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

**Culvert Sheets:** Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

**Enameling Sheets:** Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

**Electrical Sheets, No. 24:**

| | Pittsburgh Base | Pacific Ports | Granite City |
|---|---|---|---|
| Field grade | 3.20c | 3.95c | 3.30c |
| Armature | 3.55c | 4.30c | 3.65c |
| Electrical | 4.05c | 4.80c | 4.15c |
| Motor | 4.95c | 5.70c | 5.05c |
| Dynamo | 5.65c | 6.40c | 5.75c |
| Transformer 72 | 6.15c | 6.90c | ..... |
| " | 7 " | 7 90c | ..... |
| 58 | 7.65c | 8.40c | ..... |
| 52 | 8.45c | 9.20c | ..... |

**Hot-Rolled Strip:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)

**Cold Rolled Strip:** Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.

**Commodity C. R. Strip:** Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

**Cold-Finished Spring Steel:** Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

## Tin, Terne Plate

**Tin Plate:** Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

**Electrolytic Tin Plate:** Pittsburgh, Gary, 100-lb. base box $4.50.

**Tin Mill Black Plate.** Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

**Long Ternes:** Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

**Manufacturing Ternes: (Special Coated)** Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

**Roofing Ternes:** Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

## Plates

**Carbon Steel Plates:** Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.

(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill, Central Iron & Steel Co. 2.20c, f.o.b. basing points.)

**Floor Plates:** Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.

**Open-Hearth Alloy Plates:** Pittsburgh, Chicago, Coatesville, 3.50c.

**Wrought Iron Plates:** Pittsburgh, 3.80c.

## Shapes

**Structural shapes:** Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Phoenixville, for export.)

**Steel Sheet Piling:** Pittsburgh, Chicago, Buffalo, 2.40c.

## Wire Products, Nails

**Wire:** Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

| | |
|---|---|
| Bright basic, bessemer wire | 2.60c |
| Galvanized wire | 2.60c |
| Spring wire | 3.20c |

**Wire Products to the Trade:**

| | |
|---|---|
| Standard and Cement-coated wire nails, polished and staples, 100-lb. keg | $2.55 |
| Annealed fence wire, 100 lb. | 3.05 |
| Galvanized fence wire, 100 lb. | 3.40 |
| Woven fence, 12½ gage and lighter, per base column | .67 |
| Do., 11 gage and heavier | .70 |
| Barbed wire, 80-rod spool, col. | .70 |
| Twisted barbless wire, col. | .70 |
| Single loop bale ties, col. | .59 |
| Fence posts, carloads, col. | .69 |
| **Cut nails,** Pittsburgh, carloads | $3.85 |

## Pipe, Tubes

**Welded Pipe:** Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

| In. | Steel Blk. | Steel Galv. | In. | Iron Blk. | Iron Galv. |
|---|---|---|---|---|---|
| ⅛ | 56 | 33 | ½ | 24 | 3½ |
| ¼ & ⅜ | 59 | 40½ | ¾ | 30 | 10 |
| ½ | 63½ | 51 | 1-1¼ | 34 | 16 |
| ⅝ | 66½ | 55 | 1½ | 38 | 18½ |
| 1-3 | 68½ | 57½ | 2 | 37½ | 18 |

Lap Weld

| In. | Steel Blk. | Steel Galv. | In. | Iron Blk. | Iron Galv. |
|---|---|---|---|---|---|
| 2 | 61 | 49½ | 1¼ | 23 | 3½ |
| 2½-3 | 64 | 52½ | 1½ | 28½ | 10 |
| 3½-6 | 66 | 54½ | 2 | 30½ | 12 |
| 7-8 | 65 | 52½ | 2½, 3½ | 31½ | 14½ |
| 9-10 | 64½ | 52 | 4 | 33½ | 18 |
| 11-12 | 63½ | 51 | 4½-8 | 32½ | 17 |
| | | | 9-12 | 28½ | 12 |

**Boiler Tubes:** Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

| O. D. Sizes | B.W.G. | —Seamless— Hot Rolled | Cold Drawn | —Lap Weld— Steel | Charcoal Iron |
|---|---|---|---|---|---|
| 1" | 13 | $ 7.82 | $ 9.01 | ..... | ..... |
| 1¼" | 13 | 9.26 | 10.67 | ..... | ..... |
| 1½" | 13 | 10.23 | 11.72 | $ 9.72 | $23.71 |
| 1¾" | 13 | 11.64 | 13.42 | 11.06 | 22.93 |
| 2" | 13 | 13.04 | 15.03 | 12.38 | 19.35 |
| 2¼" | 13 | 14.54 | 16.76 | 13.79 | 21.63 |
| 2¼" | 12 | 16.01 | 18.45 | 15.16 | ..... |
| 2½" | 12 | 17.54 | 20.21 | 16.58 | 26.57 |
| 2¾" | 12 | 18.59 | 21.42 | 17.54 | 29.00 |
| 3" | 12 | 19.50 | 22.48 | 18.35 | 31.38 |
| 3½" | 11 | 24.63 | 28.37 | 23.15 | 39.81 |
| 4" | 10 | 30.54 | 35.20 | 28.66 | 49.90 |
| 4½" | 10 | 37.35 | 43.04 | 35.22 | ..... |
| 5" | 9 | 46.87 | 54.01 | 44.25 | 73.93 |
| 6" | 7 | 71.96 | 82.93 | 68.14 | ..... |

## Rails, Supplies

Standard rails, over 60-lb., .fo.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

## Tool Steels

**Tool Steels:** Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

**High Speed Tool Steels:**

| Tung. | Chr. | Van. | Moly. | Pitts. base, per lb. |
|---|---|---|---|---|
| 18.00 | 4 | 1 | - | 67.00c |
| 1.5 | 4 | 1 | 8.5 | 54.00c |
| | 4 | 2 | 8 | 54.00c |
| 5.50 | 4 | 1.50 | 4 | 57.50c |
| 5.50 | 4.50 | 4 | 4.50 | 70.00c |

## Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

| Type | Bars | Plates | Sheets | H. R. Strip | C. R. Strip |
|---|---|---|---|---|---|
| **CHROMIUM NICKEL STEEL** | | | | | |
| 302 | 24.00c | 27.00c | 34.00c | 21.50c | 28.00c |
| 303 | 26.00 | 29.00 | 36.00 | 27.00 | 33.00 |
| 304 | 25.00 | 29.00 | 36.00 | 23.50 | 30.00 |
| 308 | 29.00 | 34.00 | 41.00 | 28.50 | 35.00 |
| 309 | 36.00 | 40.00 | 47.00 | 37.00 | 47.00 |
| 310 | 49.00 | 52.00 | 53.00 | 48.75 | 56.00 |
| 312 | 36.00 | 40.00 | 49.00 | ..... | ..... |
| *316 | 40.00 | 44.00 | 48.00 | 40.00 | 48.00 |
| †321 | 29.00 | 34.00 | 41.00 | 29.25 | 38.00 |
| †347 | 33.00 | 38.00 | 45.00 | 33.00 | 42.00 |
| 431 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| **STRAIGHT CHROMIUM STEEL** | | | | | |
| 403 | 21.50 | 24.50 | 29.50 | 21.25 | 27.00 |
| **410 | 18.50 | 21.50 | 26.50 | 17.00 | 22.00 |
| 416 | 19.00 | 22.00 | 27.00 | 18.25 | 23.50 |
| ††420 | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 430 | 19.00 | 22.00 | 29.00 | 17.50 | 22.50 |
| ‡‡430F | 19.50 | 22.50 | 29.50 | 18.75 | 24.50 |
| 440A | 24.00 | 28.50 | 33.50 | 23.75 | 36.50 |
| 442 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 443 | 22.50 | 25.50 | 32.50 | 24.00 | 32.00 |
| 446 | 27.50 | 30.50 | 36.50 | 35.00 | 52.00 |
| 501 | 8.00 | 12.00 | 15.75 | 12.00 | 17.00 |
| 502 | 9.00 | 13.00 | 16.75 | 13.00 | 18.00 |
| **STAINLESS CLAD STEEL (20%)** | | | | | |
| 304 | ..... | §§18.00 | 19.00 | ..... | ..... |

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

**Basing Point Prices** are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

**Extras** mean additions or deductions from base prices in effect April 16, 1941.

**Delivered prices** applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.

**Domestic Ceiling prices** are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.

**Seconds,** maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.

**Export ceiling prices** may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

## Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

| | |
|---|---|
| **Carriage and Machine** | |
| ½ x 6 and smaller | 65½ off |
| Do., ⅝ and ⅝ x 6-in. and shorter | 63½ off |
| Do., ⅝ to 1 x 6-in. and shorter | 61 off |
| 1⅛ and larger, all lengths | 59 off |
| All diameters, over 6-in. long | 59 off |
| Tire bolts | 50 off |
| Step bolts | 56 off |
| Plow bolts | 65 off |
| **Stove Bolts** | |
| In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in. | |
| **Nuts** | |

| Semifinished hex. | U.S.S. | S.A.E. |
|---|---|---|
| ⅞-inch and less | 62 | 64 |
| 1-inch | 59 | 60 |
| 1⅛-1½-inch | 57 | 58 |
| 1⅝ and larger | 56 | .. |

| | |
|---|---|
| **Hexagon Cap Screws** | |
| Upset 1-in., smaller | 64 off |
| Milled 1-in., smaller | 60 off |
| **Square Head Set Screws** | |
| Upset, 1-in., smaller | 71 off |
| Headless, ¼-in., larger | 60 off |
| No. 10, smaller | 70 off |

## Piling

Pittsburgh, Chicago, Buffalo ..... 2.40c

## Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

| | |
|---|---|
| Structural | 3.75c |
| ⅞-inch and under | 65-5 off |
| Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l. | $2.75-3.00 off |

## Metallurgical Coke

Price Per Net Ton

| | |
|---|---|
| **Beehive Ovens** | |
| Connellsville, furnace | *6.50 |
| Connellsville, foundry | 7.50- 8.00 |
| Connellsville prem. fdry. | 7.75- 8.10 |
| New River, foundry | 8.50- 8.75 |
| Wise county, foundry | 8.00 |
| Wise county, furnace | 7.00 |
| **By-Product Foundry** | |
| Kearny, N. J., ovens | 12.15 |
| Chicago, outside delivered | 11.50 |
| Chicago, delivered | 12.25 |
| Terre Haute, delivered | 12.00 |
| Milwaukee, ovens | 12.25 |
| New England, delivered | 13.75 |
| St. Louis, delivered | †12.25 |
| Birmingham, ovens | 8.50 |
| Indianapolis, delivered | 12.00 |
| Cincinnati, delivered | 11.75 |
| Cleveland, delivered | 12.30 |
| Buffalo, delivered | 12.50 |
| Detroit, delivered | 12.25 |
| Philadelphia, delivered | 12.38 |

*Operators of hand-drawn ovens using trucked coal may charge $7.00, effective Feb. 3, 1943. †$12.75 from other than Ala., Mo., Tenn.

## Coke By-Products

Spot, gal., freight allowed east of Omaha

| | |
|---|---|
| Pure and 90% benzol | 15.00c |
| Toluol, two degree | 28.00c |
| Solvent naphtha | 27.00c |
| Industrial xylol | 27.00c |
| Per lb. f.o.b. works | |
| Phenol (car lots, returnable drums) | 12.50c |
| Do., less than car lots | 13.25c |
| Do. tank cars | 11.50c |
| Eastern Plants, per lb. | |
| Naphthalene flakes, balls, bbls., to jobbers | 8.00c |
| Per ton, bulk, f.o.b. port | |
| Sulphate of ammonia | $29.20 |

## Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

| | No. 2 Foundry | Basic | Bessemer | Malleable |
|---|---|---|---|---|
| **Bethlehem, Pa., base** | $25.00 | $24.50 | $26.00 | $25.50 |
| Newark, N. J., del. | 26.62 | 26.12 | 27.62 | 27.12 |
| Brooklyn, N. Y., del. | 27.65 | ..... | ..... | 28.15 |
| **Birdsboro, Pa.,** del. | 25.00 | 24.50 | 26.00 | 25.50 |
| **Birmingham,** base | †20.38 | †19.00 | ..... | ..... |
| Baltimore, del. | 25.67 | ..... | ..... | ..... |
| Boston, del. | 25.12 | ..... | ..... | ..... |
| Chicago, del. | †24.47 | ..... | ..... | ..... |
| Cincinnati, del. | 24.30 | 22.92 | ..... | ..... |
| Cleveland, del. | 24.12 | 23.24 | ..... | ..... |
| Newark, N. J., del. | 26.24 | ..... | ..... | ..... |
| Philadelphia, del. | 25.51 | 25.01 | ..... | ..... |
| St. Louis, del. | †24.12 | 23.24 | ..... | ..... |
| **Buffalo,** base | 24.00 | 23.00 | 25.00 | 24.50 |
| Boston, del. | 25.50 | 25.00 | 26.50 | 26.00 |
| Rochester, del. | 25.53 | ..... | 26.53 | 26.03 |
| Syracuse, del. | 26.08 | ..... | 27.08 | 26.58 |
| **Chicago,** base | 24.00 | 23.50 | 24.50 | 24.00 |
| Milwaukee, del. | 25.17 | 24.67 | 25.67 | 25.17 |
| Muskegon, Mich., del. | 27.38 | ..... | ..... | 27.38 |
| **Cleveland,** base | 24.00 | 23.50 | 24.50 | 24.00 |
| Akron, Canton, O., del. | 25.47 | 24.97 | 25.97 | 25.47 |
| **Detroit,** base | 24.00 | 23.50 | 24.50 | 24.00 |
| Saginaw, Mich., del. | 26.45 | 25.95 | 26.95 | 26.45 |
| **Duluth,** base | 24.50 | 24.00 | 25.00 | 24.50 |
| St. Paul, del. | 26.75 | 26.26 | 27.26 | 26.76 |
| **Erie, Pa.,** base | 24.00 | 23.50 | 25.00 | 24.50 |
| **Everett, Mass.,** base | 25.00 | 24.50 | 26.00 | 25.50 |
| Boston, del. | 25.50 | 25.00 | 26.50 | 26.00 |
| **Granite City, Ill.,** base | 24.00 | 23.50 | 24.50 | 24.00 |
| St. Louis, del. | 24.50 | 24.00 | ..... | 24.50 |
| **Hamilton, O.,** base | 24.00 | 23.50 | ..... | 24.00 |
| Cincinnati, del. | 24.68 | 24.68 | ..... | 25.35 |
| **Neville Island, Pa.,** base | 24.00 | 23.50 | 24.50 | 24.00 |
| §Pittsburgh, del. No. & So. sides | 24.69 | 24.19 | 25.19 | 24.69 |
| **Provo, Utah,** base | 22.00 | 21.50 | ..... | ..... |
| **Sharpsville, Pa.,** base | 24.00 | 23.50 | 24.50 | 24.00 |
| Sparrows Point, Md., base | 25.00 | 24.50 | ..... | ..... |
| Baltimore, del. | 26.05 | ..... | ..... | ..... |
| **Steelton, Pa.,** base | ..... | 24.50 | ..... | 25.50 |
| Swedeland, Pa., base | 25.00 | 24.50 | 26.00 | 25.50 |
| Philadelphia, del. | 25.89 | 25.39 | ..... | 26.39 |
| **Toledo, O.,** base | 24.00 | 23.50 | 24.50 | 24.00 |
| Mansfield, O., del. | 26.06 | 25.56 | 26.56 | 26.06 |
| **Youngstown, O.,** base | 24.00 | 23.50 | 24.50 | 24.00 |

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

**High Silicon, Silvery**

| | | | |
|---|---|---|---|
| 6.00-6.50 per cent (base) | $29.50 | | |
| 6.51-7.00 | $30.50 | 9.01- 9.50 | $35.50 |
| 7.01-7.50 | 31.50 | 9.51-10.00 | 36.50 |
| 7.51-8.00 | 32.50 | 10.01-10.50 | 37.50 |
| 8.01-8.50 | 33.50 | 10.51-11.00 | 38.50 |
| 8.51-9.00 | 34.50 | 11.01-11.50 | 39.50 |

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

**Bessemer Ferrosilicon**

Prices same as for high silicon silvery iron, plus $1 per gross ton.

**Charcoal Pig Iron**

Northern

Lake Superior Furn. ..... $28.00
Chicago, del. ..... 31.54
(For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn. $28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn. 33.00

**Gray Forge**

Neville Islands, Pa. ..... $23.50
Neville Island, Pa. ..... $23.50

**Low Phosphorus**

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

**Switching Charges:** Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

**Silicon Differentials:** Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

**Phosphorus Differential:** Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

**Manganese Differentials:** Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

**Ceiling Prices** are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

**Exceptions to Ceiling Prices:** Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

## Refractories

Per 1000 f.o.b. Works, Net Prices

**Fire Clay Brick**

Super Quality

| | |
|---|---|
| Pa., Mo., Ky. | $64.60 |

First Quality

| | |
|---|---|
| Pa., Ill., Md., Mo., Ky. | 51.30 |
| Alabama, Georgia | 51.30 |
| New Jersey | 56.00 |
| Ohio | 43.00 |

Second Quality

| | |
|---|---|
| Pa., Ill., Md., Mo., Ky. | 46.55 |
| Alabama, Georgia | 38.00 |
| New Jersey | 49.00 |
| Ohio | 36.00 |

**Malleable Bung Brick**

| | |
|---|---|
| All bases | $59.85 |

**Silica Brick**

| | |
|---|---|
| Pennsylvania | $51.30 |
| Joliet, E. Chicago | 58.90 |
| Birmingham, Ala. | 51.30 |

**Ladle Brick**

(Pa., O., W. Va., Mo.)

| | |
|---|---|
| Dry press | $31.00 |
| Wire cut | 29.00 |

**Magnesite**

| | |
|---|---|
| Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk | 22.00 |
| net ton, bags | 26.00 |

**Basic Brick**

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

| | |
|---|---|
| Chrome brick | $54.00 |
| Chem. bonded chrome | 54.60 |
| Magnesite brick | 76.00 |
| Chem. bonded magnesite | 65.00 |

## Fluorspar

| | |
|---|---|
| Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail | $25.00-28.00 |
| Do., barge | 25.00-28.00 |
| No. 2 lump | 25.00-28.00 |

(Prices effective Nov. 23, 1942)

## Ferroalloy Prices

**Ferromanganese:** 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

**Spiegeleisen:** 19-21%, carlots per gross ton, Palmerton, Pa. $36.

**Electrolytic manganese:** 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

**Chromium Metal:** Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

**Ferrocolumbium:** 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

**Ferrochrome:** 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

| | Car loads | Ton lots | Less ton | Less 200 lbs. |
|---|---|---|---|---|
| 2% C. | 19.50c | 20.25c | 20.75c | 21.00c |
| 1% C. | 20.50c | 21.25c | 21.75c | 22.00c |
| 0.20% C. | 21.50c | 22.25c | 22.75c | 23.00c |
| 0.10% C. | 22.50c | 23.25c | 23.75c | 24.00c |

Spot is ¼c higher

**Chromium briquets:** Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

**Ferromolybdenum:** 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

**Calcium Molybdate (Molyte):** 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

**Molybdic Oxide Briquets:** 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

**Molybdenum Oxide:** 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

**Molybdenum Powder:** 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

**Ferrophosphorus:** 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

**Ferrophosphorus:** 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

**Ferrosilicon:** Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

| | Carloads | Ton lots |
|---|---|---|
| 50% | $ 74.50 | $ 87.00 |
| Unitage | 1.50 | 1.75 |
| 75% | 135.00 | 151.00 |
| Unitage | 1.80 | 2.00 |
| 85% | 170.00 | 188.00 |
| Unitage | 2.00 | 2.20 |
| 90-95% | 10.25c | 11.25c |

Spot prices ¼-cent higher.

**Silicon Metal:** Contract basis per lb., f.o.b. producers plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

**Silicon Metal:** Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

**Silicon Briquets:** Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

**Silicomanganese:** Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

**Silico-manganese Briquets:** Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

**Ferrotungsten:** Carlots, per lb. contained tungsten, $1.90.

**Tungsten Metal Powder:** 98-99%, per lb. any quantity $2.55-2.65.

**Ferrotitanium:** 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot up 5 cents per lb.

**Ferrotitanium:** 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

**High-Carbon Ferrotitanium:** 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

**Ferrovanadium:** 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

**Vanadium Pentoxide:** Technical grade, 88-92 per cent $V_2O_5$; contracts, any quantity, $1.10 per pound $V_2O_5$ contained; spot 5 cents up.

**Zirconium Alloys:** 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

**Zirconium alloy:** 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

**Alsifer:** (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ½-cent higher.

**Simanal:** (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.00c; ton lots 10.50c, less ton lots, 11.00c.

**Borosil:** 3 to 4% boron, 40 to 45% Si., $7 lb. cont Bo., f.o.b. Philo, O.

# WAREHOUSE STEEL PRICES

*Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials.*

| | Hot rolled bars | Structural shapes | Plates | Floor plates | Hot rolled sheets (10 gage base) | Hot rolled bands (12 gage and heavier) | Hot rolled hoops (14 gage and lighter) | Galvanized flat sheets (24 gage base) | Cold rolled sheets (17 gage base) | Cold finished bars | Cold-rolled strip | AISI hot bars 2300 series | AISI hot bars 3100 series |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Boston | 4.075[1] | 3.933[1] | 3.933[1] | 5.758[1] | 3.805[1] | 4.137[1] | 5.137[1] | 5.255[14] | 4.775[14] | 4.175[21] | 4.725 | 7.783[23] | 6.083[23] |
| New York | 3.884[1] | 3.778[1] | 3.788[1] | 5.605[1] | 3.611[1] | 4.005[1] | 4.005[1] | 5.031[13] | 4.644[14] | 4.134[21] | 3.555 | 7.600[23] | 5.900[23] |
| Philadelphia | 3.843[1] | 3.677[1] | 3.615[1] | 5.293[1] | 3.538[1] | 3.943[1] | 4.293[1] | 5.038[15] | 4.893[20] | 4.093[21] | 4.793 | 7.577[23] | 5.877[23] |
| Baltimore | 3.833[1] | 3.780[1] | 3.605[1] | 5.283[1] | 3.405[1] | 3.933[1] | 4.283[1] | 4.905[1] | 4.883[20] | 4.083[21] | ..... | ..... | ..... |
| Washington, D. C. | 3.95[1] | 3.80[1] | 3.80[1] | 5.35[1] | 3.60[1] | 4.10[1] | 4.45[1] | 5.15[17] | 5.10[20] | 4.03[21] | ..... | ..... | ..... |
| Norfolk, Va. | 4.096[1] | 4.022[1] | 3.991[1] | 5.496[1] | 3.791[1] | 4.196[1] | 4.546[1] | 5.391[17] | 4.996[24] | 4.196[21] | ..... | ..... | ..... |
| Bethlehem, Pa.* | .... | 3.45[1] | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Claymont, Del.* | .... | .... | 3.45[1] | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Coatesville, Pa.* | .... | .... | 3.45[1] | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Buffalo (city) | 3.35[1] | 3.40[1] | 3.62[1] | 5.25[1] | 3.25[1] | 3.82[1] | 3.82[1] | 4.75[13] | 4.30[20] | 3.75[21] | 3.52 | 7.35[23] | 5.65[23] |
| Buffalo (country) | 3.25[1] | 3.30[1] | 3.62[1] | 5.25[1] | 3.15[1] | 3.82[1] | 3.82[1] | 4.65[13] | 4.20[20] | 3.65[21] | .... | .... | .... |
| Pittsburgh (city) | 3.35[1] | 3.40[1] | 3.40[1] | 5.00[1] | 3.35[1] | 3.60[1] | 3.60[1] | 4.75[13] | 4.00[24] | 3.65[21] | .... | 7.45[23] | 5.75[23] |
| Pittsburgh (country) | 3.25[1] | 3.30[1] | 3.30[1] | 4.90[1] | 3.25[1] | 3.50[1] | 3.50[1] | 4.65[13] | 4.00[24] | 3.65[21] | .... | .... | .... |
| Cleveland (city) | 3.25[1] | 3.58[1] | 3.40[1] | 5.18[1] | 3.35[1] | 3.50[1] | 3.50[1] | 4.62[13] | 4.05[24] | 3.75[21] | 3.20 | 7.55[23] | 5.85[23] |
| Cleveland (country) | 3.25[1] | 3.58[1] | 3.30[1] | 5.18[1] | 3.25[1] | 3.50[1] | 3.50[1] | 4.62[13] | 3.95[24] | 3.65[21] | .... | .... | .... |
| Detroit | 3.43[1] | 3.65[1] | 3.60[1] | 5.27[1] | 3.43[1] | 3.43[1] | 3.68[1] | 4.84[13] | 4.30[24] | 3.80[21] | 3.40 | 7.67[23] | 5.97[23] |
| Omaha (city) | 4.10[1] | 4.15[1] | 4.15[1] | 5.75[1] | 3.85[1] | 4.20[1] | 4.20[1] | 5.52[20] | 4.77[24] | 4.42[21] | .... | .... | .... |
| Omaha (country) | 4.00[1] | 4.05[1] | 4.05[1] | 5.65[1] | 3.75[1] | 4.10[1] | 4.10[1] | 5.52[20] | 4.77[24] | 4.42[21] | .... | .... | .... |
| Cincinnati | 3.60[1] | 3.68[1] | 3.65[1] | 5.28[1] | 3.42[1] | 3.67[1] | 3.67[1] | 4.92[20] | 4.37[24] | 4.00[21] | 3.45 | 7.69[23] | 5.99[23] |
| Youngstown, O.* | .... | .... | .... | .... | .... | .... | .... | 4.40[13] | .... | .... | .... | .... | .... |
| Middletown, O.* | .... | .... | .... | .... | 3.25[1] | 3.50[1] | 3.50[1] | 4.40[13] | .... | .... | .... | .... | .... |
| Chicago (city) | 3.50[1] | 3.55[1] | 3.55[1] | 5.15[1] | 3.25[1] | 3.60[1] | 3.60[1] | 4.85[13] | 4.10[24] | 3.75[21] | 3.50 | 7.35[23] | 5.65[23] |
| Chicago (country) | 3.40[1] | 3.45[1] | 3.45[1] | 5.05[1] | 3.15[1] | 3.50[1] | 3.50[1] | 4.75[13] | 4.00[24] | 3.65[21] | .... | .... | .... |
| Milwaukee | 3.63[1] | 3.68[1] | 3.68[1] | 5.28[1] | 3.38[1] | 3.73[1] | 3.73[1] | 4.98[13] | 4.23[24] | 3.88[21] | 3.54 | 7.33[23] | 5.88[23] |
| St. Paul | 3.75[1] | 3.80[1] | 3.80[1] | 5.40[1] | 3.50[1] | 3.85[1] | 3.85[1] | 5.00[1] | 4.35[1] | 4.34[21] | 3.83 | 7.70[23] | 6.00[23] |
| St. Louis | 3.64[1] | 3.69[1] | 3.69[1] | 5.29[1] | 3.39[1] | 3.74[1] | 3.74[1] | 4.99[13] | 4.24[24] | 4.02[21] | 3.61 | 7.72[23] | 6.02[23] |
| Indianapolis (city) | 3.60[1] | 3.70[1] | 3.70[1] | 5.30[1] | 3.45[1] | 3.75[1] | 3.75[1] | 5.01[13] | 4.25[24] | 3.97[21] | .... | .... | .... |
| Indianapolis (country) | 3.35[1] | 3.45[1] | 3.40[1] | 5.05[1] | 3.20[1] | 3.50[1] | 3.50[1] | 5.01[13] | 4.00[24] | 3.97[21] | .... | .... | .... |
| Memphis, Tenn. | 3.90[6] | 3.95[3] | 3.95[3] | 5.71[3] | 3.85[3] | 4.10[6] | 4.10[3] | 5.25[11] | 4.66[24] | 4.31[21] | .... | .... | .... |
| Birmingham (city) | 3.50[3] | 3.55[3] | 3.55[3] | 5.83[3] | 3.45[3] | 3.70[3] | 3.70[3] | 4.75[13] | 4.78[24] | 4.43[21] | .... | .... | .... |
| Birmingham (country) | 3.40[3] | 3.45[3] | 3.45[3] | 5.83[3] | 3.35[3] | 3.60[3] | 3.60[3] | 4.75[13] | 4.78[24] | 4.43[21] | .... | .... | .... |
| New Orleans (city) | 4.10[4] | 3.90[4] | 3.90[4] | 5.85[4] | 3.95[4] | 4.20[4] | 4.20[4] | 5.25[20] | 4.95[10] | 4.60[21] | 5.00 | .... | .... |
| New Orleans (country) | 4.00[4] | 3.80[4] | 3.80[4] | 5.75[4] | 3.85[4] | 4.10[4] | 4.10[4] | 5.15[20] | 4.95[10] | 4.60[21] | .... | .... | .... |
| Houston, Tex. | 3.75[3] | 4.25[3] | 4.25[3] | 5.50[3] | 3.75[3] | 4.30[3] | 4.30[3] | 5.25[20] | 5.43[10] | 4.50[21] | .... | .... | .... |
| Los Angeles | 4.35[4] | 4.60[4] | 4.90[4] | 7.15[4] | 4.95[4] | 4.90[4] | 6.70[4] | 5.95[19] | 7.15[5] | 5.70[22] | .... | 9.55[23] | 8.55[23] |
| San Francisco (city) | 3.95[7] | 4.35[7] | 4.65[7] | 6.35[7] | 4.55[7] | 4.50[7] | 4.50[7] | 6.60[19] | 7.55[10] | 5.55[19] | .... | 9.80[5] | 8.80[5] |
| San Francisco (country) | 3.85[7] | 4.25[7] | 4.55[7] | 6.25[7] | 4.45[7] | 4.40[7] | 4.40[7] | 6.50[19] | 7.45[10] | 5.45[19] | .... | .... | .... |
| Tacoma | 4.20[8] | 4.45[8] | 4.75[8] | 6.50[8] | 4.65[8] | 4.25[9] | 5.45[9] | 5.70[8] | 6.63[24] | 5.75[22] | .... | .... | .... |
| Seattle (city) | 4.20[8] | 4.45[8] | 4.75[8] | 6.50[8] | 4.65[8] | 4.35[9] | 5.45[9] | 5.70[8] | 6.63[24] | 5.75[22] | .... | .... | 8.00[8] |

*Basing point cities, with quotations representing mill prices, plus warehouse spread.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendment No. 10 to Revised Price Schedule No. 49.

### BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [18]—one to six bundles; [19]—100 to 749 pounds; [20]—300 to 1999 pounds; [21]—1500 to 39,999 pounds; [22]—1500 to 1999 pounds; [23]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [25]—1000 to 1999 pounds; [26]—under 25 bundles. Cold-rolled strip, any quantity is base.

## Ores

**Lake Superior Iron Ore**
*Gross ton, 51½%*
*Lower Lake Ports*

| | |
|---|---|
| Old range bessemer | $4.75 |
| Mesabi nonbessemer | 4.45 |
| High phosphorus | 4.35 |
| Mesabi bessemer | 4.60 |
| Old range nonbessemer | 4.60 |

**Eastern Local Ore**
*Cents, unit, del. E. Pa.*

| | |
|---|---|
| Foundry and basic 56-63%, contract | 13.00 |

**Foreign Ore**
*Cents per unit, c.i.f. Atlantic ports*

| | |
|---|---|
| Manganiferous ore, 45-55% Fe., 6-10% Mang. | Nom. |
| N. African low phos. | Nom. |
| Spanish, No. African basic, 50 to 60% | Nom. |
| Brazil iron ore, 68-69% f.o.b. Rio de Janeiro | 7.50-8.00c |

**Tungsten Ore**

| | |
|---|---|
| Chinese wolframite, per short ton unit, duty paid | $24.00 |

**Chrome Ore**
(Equivalent OPA schedules):
*Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.*
*(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)*

| | |
|---|---|
| Indian and African | |
| 48% 2.8:1 | 41.00 |
| 48% 3:1 | 43.50 |
| 48% no ratio | 31.00 |
| South African (Transvaal) | |
| 44% no ratio | 27.40 |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 50% no ratio | 32.80 |
| Brazilian—nominal | |
| 44% 2.5:1 lump | 33.65 |
| 48% 3:1 lump | 43.50 |
| Rhodesian | |
| 45% no ratio | 28.30 |
| 48% no ratio | 31.00 |
| 48% 3:1 lump | 43.50 |
| Domestic (f.o.b. Columbus, Mont.) | |
| 48% 3:1 | 43.50 |

less $7 freight allowance

**Manganese Ore**
*Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)*

| | |
|---|---|
| Brazilian, 48% | 73.8c |
| Brazilian, 46% | 71.8c |
| Caucasian, 51% | 75.3c |
| Caucasian, 50% | 74.8c |
| Chilean, 48% | 73.8c |
| Indian, 50% | 74.8c |
| Indian, 48% | 73.8c |
| South African, 48% | 73.8c |
| South African, 46% | 71.8c |
| (Duty Free) | |
| Cuban, 51% | 86.5c |
| Cuban, 48% | 85.0c |
| Cuban, 45% | 82.0c |
| Philippine, 50% | 85.0c |
| Domestic, 48%, f.o.b. mines | 98.0c |

**Molybdenum**

| | |
|---|---|
| Sulphide conc., lb., Mo. cont., mines | $0.75 |

## NATIONAL EMERGENCY STEELS (Hot Rolled)

*(Extras for alloy content)*

| Designation | Carbon | Mn. | Si. | Cr. | Ni. | Mo. | Basic open-hearth Bars per 100 lb. | Basic open-hearth Billets per G T | Electric furnace Bars per 100 lb. | Electric furnace Billets per G T |
|---|---|---|---|---|---|---|---|---|---|---|
| | Chemical Composition Limits, Per Cent | | | | | | | | | |
| NE 1330 | .28-.33 | 1.60-1.90 | .20-.35 | ..... | ..... | ..... | $ .10 | $2.00 | .... | ..... |
| NE 8020 | .18-.23 | 1.00-1.30 | .20-.35 | ..... | ..... | .10-.20 | .45 | 9.00 | $.95 | $19.00 |
| NE 8442 | .40-.45 | 1.30-1.60 | .20-.35 | ..... | ..... | .30-.40 | .90 | 18.00 | 1.40 | 28.00 |
| NE 8613 | .12-.17 | .70- .90 | .20-.35 | .40-.60 | .40-.70 | .15-.25 | .75 | 15.00 | 1.25 | 25.00 |
| NE 8720 | .18-.18 | .70- .90 | .20-.35 | .40-.60 | .40-.70 | .20-.30 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9255 | .50-.60 | .75-1.00 | 1.80-2.20 | ..... | ..... | .40 | 8.00 | .... | .... | .... |
| NE 9262 | .55-.65 | .75-1.00 | 1.80-2.20 | .20-.40 | ..... | ..... | .65 | 13.00 | .... | ..... |
| NE 9415 | .13-.18 | .80-1.10 | .40-.60 | .20-.40 | .20-.50 | .08-.15 | .80 | 16.00 | 1.30 | 26.00 |
| NE 9442 | .40-.45 | 1.00-1.30 | .40-.60 | .20-.40 | .20-.50 | .08-.15 | .85 | 17.00 | 1.35 | 27.00 |
| NE 9537 | .35-.40 | 1.20-1.50 | .40-.60 | .40-.60 | .40-.70 | .15-.25 | 1.20 | 24.00 | 1.70 | 34.00 |
| NE 9630 | .28-.33 | 1.20-1.50 | .40-.60 | .40-.60 | ..... | ..... | .80 | 16.00 | 1.30 | 26.00 |
| NE 9642 | .40-.45 | 1.30-1.60 | .40-.60 | .40-.60 | ..... | ..... | .85 | 17.00 | 1.35 | 27.00 |

Extras are in addition to a base price of 2.70c, per pound on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per pound and dollars per gross ton. No prices quoted on vanadium alloy.

# MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

## PRICES FOR OTHER THAN RAILROAD SCRAP

| | ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Low Phos. Grades | | | | | | | | | |
| | OPEN HEARTH GRADES* | Mixed Bor., Turn., Machine Turnings | Cast Iron Borings | Shoveling Turnings | Billet, Bloom Forge Crops | Bar Crops and smaller; Punchings, Plate | Heavy Structural, Plate 3 ft. and less | Heavy Structural, Plate 2 ft. and less | Heavy Structural, Plate 1 ft. and less | Foundry Steel 2 ft. and less | Foundry Steel 1 ft. and less | Alloy-Free Low Phos. & Sulphur Turnings | First Cut Heavy Axle & Forge Turnings | Electric Furnace Bundles |
| Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren | $20.00 | $15.00 | $16.00 | $17.00 | $25.00 | $22.50 | $21.50 | $22.00 | $22.50 | $21.50 | $22.00 | $18.00 | $19.50 | $21.00 |
| Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville | 18.75 | 13.75 | 14.75 | 15.75 | 23.75 | 21.25 | 20.25 | 20.75 | 21.25 | 20.25 | 20.75 | 16.75 | 18.25 | 19.75 |
| Bethlehem | 18.25 | 13.25 | 14.25 | 15.25 | 23.25 | 20.75 | 19.75 | 20.25 | 20.75 | 19.75 | 20.25 | 16.25 | 17.75 | 19.25 |
| Buffalo | 19.25 | 14.25 | 15.25 | 16.25 | 24.25 | 21.75 | 20.75 | 21.25 | 21.75 | 20.75 | 21.25 | 17.25 | 18.75 | 20.25 |
| Cleveland, Middletown, Cincinnati, Portsmouth, Ashland | 19.50 | 14.50 | 15.50 | 16.50 | 24.50 | 22.00 | 21.00 | 21.50 | 22.00 | 21.00 | 21.50 | 17.50 | 19.00 | 20.50 |
| Detroit | 17.85 | 12.85 | 13.85 | 14.85 | 22.85 | 20.35 | 19.35 | 19.85 | 20.35 | 19.35 | 19.85 | 15.85 | 17.35 | 18.85 |
| Toledo | †15.35 | 12.85 | 13.85 | 14.85 | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Chicago | 18.75 | 13.75 | 14.75 | 15.75 | 23.75 | 21.25 | 20.25 | 20.75 | 21.25 | 20.25 | 20.75 | 16.75 | 18.25 | 19.75 |
| Kokomo | 18.25 | 13.25 | 14.25 | 15.25 | 23.25 | 20.75 | 19.75 | 20.25 | 20.75 | 19.75 | 20.25 | 16.25 | 17.75 | 19.25 |
| Duluth | 18.00 | 13.00 | 14.00 | 15.00 | 23.00 | 20.50 | 19.50 | 20.00 | 20.50 | 19.50 | 20.00 | 16.00 | 17.50 | 19.00 |
| St. Louis | 17.50 | 12.50 | 13.50 | 14.50 | 22.50 | 20.00 | 19.00 | 19.50 | 20.00 | 19.00 | 19.50 | 15.50 | 17.00 | 18.50 |
| Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif. | 17.00 | 12.00 | 13.00 | 14.00 | 22.00 | 19.50 | 18.50 | 19.00 | 19.50 | 18.50 | 19.00 | 15.00 | 16.50 | 18.00 |
| Minnequa, Colo. | 16.50 | 11.50 | 12.50 | 13.50 | 21.50 | 19.00 | 18.00 | 18.50 | 19.00 | 18.00 | 18.50 | 14.50 | 16.00 | 17.50 |
| Seattle | 14.50 | 9.50 | 10.50 | 11.50 | 19.50 | 17.00 | 16.00 | 16.50 | 17.00 | 16.00 | 16.50 | 12.50 | 14.00 | 15.50 |

## RAILROAD SCRAP

| | Heavy Melting Steel | Scrap Rails | Rails for Rolling | Scrap Rails 3 ft. and under | Scrap Rails 2 ft. and under | Scrap Rails 18 in. and under |
|---|---|---|---|---|---|---|
| Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton | $21.00 | $22.00 | $23.50 | $24.00 | $24.25 | $24.50 |
| Philadelphia, Wilmington, Sparrows Point | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Cleveland, Cincinnati, Middletown, Ashland, Portsmouth | 20.50 | 21.50 | 23.00 | 23.50 | 23.75 | 24.00 |
| Chicago | 19.75 | 20.75 | 22.25 | 22.75 | 23.00 | 23.25 |
| Buffalo | 20.25 | 21.25 | 22.75 | 23.25 | 23.50 | 23.75 |
| Detroit | 18.85 | 19.85 | 21.35 | 21.85 | 22.10 | 22.35 |
| Kokomo | 19.25 | 20.25 | 21.75 | 22.25 | 22.50 | 22.75 |
| Duluth | 19.00 | 20.00 | 21.50 | 22.00 | 22.25 | 22.50 |
| Kansas City, Mo. | 17.00 | 18.00 | 19.50 | 20.00 | 20.25 | 20.50 |
| St. Louis | 18.50 | 19.50 | 21.00 | 21.50 | 21.75 | 22.00 |
| Birmingham | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Los Angeles, San Francisco | 18.00 | 19.00 | 20.50 | 21.00 | 21.25 | 21.50 |
| Seattle | 15.50 | 16.50 | 18.00 | 18.50 | 18.75 | 19.00 |

## CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

| | Group A | Group B | Group C |
|---|---|---|---|
| No. 1 Cupola Cast | $18.00 | $19.00 | $20.00 |
| No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under | 18.00 | 19.00 | 20.00 |
| Clean Auto Cast | 18.00 | 19.00 | 20.00 |
| Stove Plate | 17.00 | 18.00 | 19.00 |
| Unstripped Motor Blocks | 15.50 | 16.50 | 17.50 |
| Heavy Breakable Cast | 15.50 | 16.50 | 17.50 |
| Charging Box Size Cast | 17.00 | 18.00 | 19.00 |
| Miscellaneous Malleable | 20.00 | 21.00 | 22.00 |

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel. No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

**A basing point** includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

**Inferior Grades:** Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

**Commissions:** No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

**Maximum Shipping Point Price:** Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

**Maximum Delivered Prices:** Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

**Unprepared Scrap:** Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grades of prepared scrap."

**Remote Scrap:** Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

# NONFERROUS METAL PRICES

**Copper:** Electrolytic or Lake from producers in carlots 12.00c, Del. Conn., less carlots 12.12½, refinery; dealers may add ¼c for 5000 lbs. to carload; 1000-4999 lbs. 1c; 500-999 1½c; 0-499 2c. Casting, 11.75c, refinery for 20,000 lbs., or more, 12.00c less than 20,000 lbs.

**Brass Ingot:** Carlot prices, including 25 cents per hundred freight allowance; add ¼c for less than 20 tons; 85-5-5-5 (No. 115) 12.25c; 88-10-2 (No. 215) 16.50c; 80-10-10 (No. 305) 14.25c; Navy G (No. 225) 16.75c; Navy M (No. 245) 14.75c; No. 1 yellow (No. 405) 10.00c; manganese bronze (No. 420) 12.75c.

**Zinc:** Prime western 8.25c, select 8.35c, brass special 8.50c, intermediate 8.75c, E. St. Louis, for carlots. For 20,000 lbs. to carlots add 0.15c; 10,000-20,000 0.25c; 2000-10,000 0.40c; under 2000 0.50c.

**Lead:** Common 6.35c, corroding or chemical, 6.40c, E. St. Louis for carlots; add 5 points for Chicago, Minneapolis-St. Paul, Milwaukee-Kenosha districts; add 15 points for Cleveland-Akron-Detroit area, New Jersey, New York State, Texas, Pacific Coast, Richmond, Indianapolis-Kokomo; add 20 points for Birmingham, Connecticut, Boston-Worcester-Springfield, New Hampshire, Rhode Island.

**Primary Aluminum:** 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lbs. and over; add ½c 2000-9999 lbs.; 1c less than 2000 lbs.

**Secondary Aluminum:** All grades 15.00c per lb. except as follows: Low-grade piston alloy (No. 122 type) 14.50c; No. 12 foundry alloy (No. 2 grade) 14.50c; chemical warfare service ingot (99½% plus) 14.50c; steel deoxidizers in notchbars, granulated or shot, including ingot containing over 2% iron, Grade 1 (95-97½%) 14.75c, Grade 2 (92-95%) 14.50c, Grade 3 (90-92%) 14.00c, Grade 4 (85-90%) 13.50c, Grade 5 (less than 85%) 12.50c. Above prices for 30,000 lbs. or more; add ¼c 10,000-30,000 lbs.; ½c 1000-10,000 lbs.; 1c less than 1000 lbs. Prices include freight at carload rate up to 75 cents per hundred.

**Magnesium:** Commercially pure (99.8%) standard ingots (4-notch, 17 lbs.) 20.50c lb.; add 1c for special shapes and sizes, including 3-lb. ingot and 12-lb. round ingot; incendiary bomb alloy 23.40c, 50-50 magnesium-aluminum 23.75c, ASTM B80-41T No. 11 25.00c, ASTM B94-40T No. 13 25.00c, all others 23.00c. Prices for 100 lbs. or more; for 25-100 lbs. add 10c; for less than 25 lbs. 20c; incendiary bomb alloy f.o.b. plant any quantity; carload freight rate allowed all others for 500 lbs. or more.

**Tin:** Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lbs., 1¼c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 52.00c; Grade B, 99.75-99.79% incl. 51.62½c; Grade C, Cornish refined 51.62½c; Grade D, 99.0-99.74% incl. 51.12½c, Grade E, below 99%, 51.00c.

**Antimony:** American, bulk, carlots, f.o.b. Laredo, Tex., 99.0-99.8% grade 14.50c, 99.8% and over (arsenic 0.05% max.; no other impurity to exceed 0.1% 15.00c. Add ¼c for less-carlots to 10,000 lbs.; ½c for 9999-224 lbs.; 2c for 223 lbs. and less.

**Nickel:** Electrolytic cathodes, 99.5%, f.o.b. refinery 35.00c lb.; pig and shot produced from electrolytic cathodes 36.00c; "F" nickel shot or ingot for additions to cast iron, 34.00c; Monel shot 28.00c.

**Mercury:** Prices per 76-lb. flask f.o.b. point of shipment or entry. Domestic produced in Calif., Oreg., Wash., Idaho, Nev., Ariz. $191; produced in Texas, Ark. $193. Foreign, produced in Mexico, duty paid, $193.

**Arsenic:** Prime, white, 99%, carlots, 4.00c lb.

**Beryllium-Copper:** 3.75-4.25% Be., $15 lb. contained Be.

**Cadmium:** Bars, ingots, pencils, pigs, plates, rods, slabs, sticks and all other "regular" straight or flat forms 90.00c lb., del.; anodes, balls, discs and all other special or patented shapes 95.00c lb. del.

**Cobalt:** 97-99%, $2.11 lb.; 100 lbs. or more on contract, $1.50 lb.

**Indium:** 99.5%, $10 per troy ounce.

**Gold:** U. S. Treasury, $35 per ounce.

**Silver:** Open market, N. Y., 44.75c per ounce.

**Platinum:** $36 per ounce.

**Iridium:** $165 per troy ounce.

**Palladium:** $24 per troy ounce.

## Rolled, Drawn, Extruded Products

(Copper and brass product prices based on 12.00c, Conn., for copper. Freight prepaid on 100 lbs. or more.)

**Sheet:** Copper 20.87c; yellow brass 19.48c; commercial bronze, 90% 21.07c, 95% 21.28c; red brass, 80% 20.15c, 85% 20.36c; phosphor bronze, Grades A, B 5% 36.25c; Everdur, Herculoy, Duronze or equiv. 26.00c; naval brass 24.50c; manganese bronze 28.00c; Muntz metal 22.75c; nickel silver 5% 26.50c.

**Rods:** Copper, hot-rolled 17.37c, cold-rolled 18.37c; yellow brass 15.01c; commercial bronze 90% 21.32c, 95% 21.53c; red brass 80% 20.40c, 85% 20.61c; phosphor bronze Grade A, B 5% 36.50c; Everdur, Herculoy, Duronze or equiv. 25.50c; Naval brass 19.12c; manganese bronze 22.50c; Muntz metal 18.87c; nickel silver 5% 28.75c.

**Seamless Tubing:** Copper 21.37c; yellow brass 22.23c; commercial bronze 90% 23.47c; red brass 80% 22.80c, 85% 23.01c.

**Extruded Shapes:** Copper 20.87c; architectural bronze 19.12c; manganese bronze 24.00c, Muntz metal 20.12c; Naval brass 20.37c.

**Angles and Channels:** Yellow brass 27.98c; commercial bronze 90% 29.57c, 95% 29.78c; red brass 80% 28.65c, 85% 28.86c.

**Copper Wire:** Bare, soft, f.o.b. Eastern mills, carlots 15.37½c, less-carlots 15.87½c; weatherproof, f.o.b. Eastern mills, carlots 17.00c, less-carlots 17.50c; magnet, delivered, carlots 17.50c, 15,000 lbs. or more 17.75c, less carlots 18.25c.

**Aluminum Sheets and Circles:** 2s and 3s, flat, mill finish, base 30,000 lbs. or more; del.; sheet widths as indicated; circle diameters 9" and larger:

| Gage | Width | Sheets | Circles |
|---|---|---|---|
| .249"-7 | 12"-48" | 22.70c | 25.20c |
| 8-10 | 12"-48" | 23.20c | 25.70c |
| 11-12 | 26"-48" | 24.20c | 27.00c |
| 13-14 | 26"-48" | 25.20c | 28.50c |
| 15-16 | 26"-48" | 26.40c | 30.40c |
| 17-18 | 26"-48" | 27.90c | 32.90c |
| 19-20 | 24"-42" | 29.80c | 35.30c |
| 21-22 | 24"-42" | 31.70c | 37.20c |
| 23-24 | 9"-24" | 25.60c | 29.20c |

**Lead Products:** Prices to jobbers; full sheets 9.50c; cut sheets 9.75c; pipe 8.15c, New York; 8.50c Philadelphia, Baltimore, Rochester and Buffalo; 8.75c, Chicago, Cleveland, Worcester, Boston.

**Zinc Products:** Sheet f.o.b. mill, 13.15c; 36,000 lbs. and over deduct 7%, Ribbon and strip 12.25c, 3000-lb. lots deduct 1%, 6000 lbs. 2%, 9000 lbs. 3%, 18,000 lbs. 4%, carloads and over 7%. Boiler plate (not over 12") 3 tons and over 11.00c; 1-3 tons 12.00c; 500-2000 lbs. 12.50c; 100-500 lbs. 13.00c; under 100 lbs. 14.00c. Hull plate (over 12") add 1c to boiler plate prices.

## Plating Materials

**Chromic Acid:** 99.75%, flake, del., carloads 16.25c; 5 tons and over 16.75c; 1-5 tons 17.25c; 400 lbs. to 1 ton 17.75c; under 400 lbs. 18.25c.

**Copper Anodes:** Base 2000-5000 lbs., del.; oval 17.62c; untrimmed 18.12c; electro-deposited 17.37c.

**Copper Carbonate:** 52-54% metallic cu; 250 lb. barrels 20.50c.

**Copper Cyanide:** 70-71% cu, 100-lb. kegs or bbls. 34.00c f.o.b. Niagara Falls.

**Sodium Cyanide:** 96%, 200-lb. drums 15.00c; 10,000-lb. lots 13.00c f.o.b. Niagara Falls.

**Nickel Anodes:** 500-2999 lb. lots; cast and rolled, carbonized 47.00c; rolled, depolarized 48.00c.

**Nickel Chloride:** 100-lb. kegs or 275-lb. bbls. 18.00c lb., del.

**Tin Anodes:** 1000 lbs. and over 58.50c, del.; 500-999 59.00c; 200-499 59.50c; 100-199 61.00c.

**Tin Crystals:** 400-lb. bbls. 39.00c f.o.b. Graselli, N. J.; 100-lb. kegs 39.50c.

**Sodium Stannate:** 100 or 300-lb. drums 36.50c, del.; ton lots 33.50c.

**Zinc Cyanide:** 100-lb. kegs or bbls. 33.00c, f.o.b. Niagara Falls.

## Scrap Metals

**Brass Mill Allowances:** Prices for less than 15,000 lbs. f.o.b. shipping point. Add ¾c for 15,000-40,000 lbs.; 1c for 40,000 lbs. or more.

| | Clean Heavy | Rod Ends | Clean Turnings |
|---|---|---|---|
| Copper | 10.250 | 10.250 | 9.500 |
| Tinned Copper | 9.625 | 9.625 | 9.375 |
| Yellow Brass | 8.625 | 8.375 | 7.875 |
| Commercial bronze | | | |
| 90% | 9.375 | 9.125 | 8.625 |
| 95% | 9.500 | 9.250 | 8.750 |
| Red Brass, 85% | 9.125 | 8.875 | 8.375 |
| Red Brass, 80% | 9.125 | 8.875 | 8.375 |
| Muntz metal | 8.000 | 7.750 | 7.250 |
| Nickel Sil., 5% | 9.250 | 9.000 | 4.625 |
| Phos. br., A. B. 5% | 11.00 | 10.750 | 9.750 |
| Herculoy, Everdur or equivalent | 10.250 | 10.000 | 9.250 |
| Naval brass | 8.250 | 8.000 | 7.500 |
| Mang. bronze | 8.250 | 8.000 | 7.500 |

**Other than Brass Mill Scrap:** Prices apply on material not meeting brass mill specifications and are f.o.b. shipping point; add ¾c for shipment of 60,000 lbs. of one group and ½c for 20,000 lbs. of second group shipped in same car. Typical prices follow:

(Group 1) No. 1 heavy copper and wire, No. 1 tinned copper, copper borings 9.75c; No. 2 copper wire and mixed heavy copper, copper tuyeres 8.75c.

(Group 2) soft red brass and borings, aluminum bronze 9.00c; copper-nickel and borings 9.25c; car boxes, cocks and faucets 7.75c; bell metal 15.50c; babbitt-lined brass bushings 13.00c.

(Group 3) zincy bronze borings, Admiralty condenser tubes, brass pipe 8.00c; Muntz metal condenser tubes 7.50c; yellow brass 6.25c; manganese bronze (lead 0.00%-0.40%) 7.25c, (lead 0.41%-1.0%) 6.25c; manganese bronze borings (lead 0.00-0.40%) 6.50c, (lead 0.41-1.00%) 5.50c.

**Aluminum Scrap:** Prices f.o.b. point of shipment, respectively for lots of less than 1000 lbs.; 1000-20,000 lbs. and 20,000 lbs. or more; plant scrap only. Segregated 2s solids 10.00c, 11.00c, 11.50c; all other solids 9.50c, 10.50c, 11.00c; borings and turnings 7.50c, 8.50c, 9.00c; mixed solids 8.50c, 9.50c, 10.50c, mixed borings and turnings 6.50c, 7.50c, 8.00c.

**Lead Scrap:** Prices f.o.b. point of shipment. For soft and hard lead, including cable lead, deduct 0.55c from basing point prices for refined metal.

**Zinc Scrap:** New clippings, old zinc 7.25c f.o.b. point of shipment; add ½-cent for 10,000 lbs. or more. New die-cast scrap, radiator grilles 4.95c; add ½c 20,000 or more. Unsweated zinc dross, die cast slab 5.80c any quantity.

**Nickel, Monel Scrap:** Prices f.o.b. point of shipment; add ½c for 2000 lbs. or more of nickel or cupro-nickel shipped at one time and 20,000 lbs. or more of Monel. Converters (dealers) allowed 2c premium.

**Nickel:** 98% or more nickel and not over ½% copper 26.00c; 90-98% nickel, 26.00c per lb. nickel contained.

**Cupro-nickel:** 90% or more combined nickel and copper 26.00c per lb. contained nickel, plus 8.00c per lb. contained copper; less than 90% combined nickel and copper 26.00c for contained nickel only.

**Monel:** No. 1 castings, turnings 15.00c; new clippings 20.00c; soldered sheet 18.00c.

## Sheets, Strip . . .

Sheet & Strip Prices, Page 140

While most producers are well booked for the current quarter on hot and cold-rolled sheets, some who are definitely sold out, still have capacity available for galvanized sheets. At least three report they can still make deliveries of galvanized in June.

In view of the sold-up condition in uncoated sheets, orders for third quarter shipments are increasing. At least one large eastern seller reports he is now unable to make shipments in July on either hot or cold-rolled sheets and certain others assert they are in as tight a position on cold-rolled sheets, with their hot sheet schedules filling rapidly. Orders are being placed for all three months of third quarter and in a few instances for shipment in November.

New buying is spotty, however, and fluctuates with war contracts; this is notably true of stamping operations. On a basis of delivery in most instances, the navy has placed contracts for several thousand tons of various finishes with eight mills, most of the tonnage destined for the Boston navy yard going to American Rolling Mill Co., Middletown, O.

## Bars . . .

Bar Prices, Page 140

While some second quarter capacity is available for small and medium sized carbon bars, no promises can be made for deliveries before June and some mills have little tonnage available for even that month. As for large rounds and flats, all are booked up tightly, with some mills having little or nothing to offer before August. The latter situation also applies in considerable degree to cold-drawn carbon bars. Alloy bar shipments are difficult to obtain before late August, with most promises falling in September. Where special treatment is necessary, still more extended deliveries are quoted.

The spread in delivery time between open-hearth and bessemer hot carbon bars has narrowed with only slight improvement in the former; sizes from 1¼ to 3-inch are tight. Producers of bessemer have pushed that grade for some weeks and backlogs are heavier.

In the process of validation of orders to CMP, some bar tonnage was temporarily eliminated and some scattered border-line volume which has been moving under former ratings may be pushed aside in the future under CMP; new orders are now geared to the latter setup. Including cold-drawn bars, mills are not expected to ship much strictly CMP volume before July, although some will be delivered in June.

Forging shops, among the heaviest consumers in the New England district, are slow in getting in CMP orders. On the other hand, some suppliers of parts to shipyards, including marine hardware, are placing forward commitments for last quarter delivery.

## Plates . . .

Plate Prices, Page 141

Some plate tonnage yet to be approved by Washington may be shipped before the end of June. Applications for June rollings are due to be filed by this time and some of this may be delivered in June under the existing plate allocation plan, but this probably will not be heavy. Practically all plate orders now being received carry CMP certification and in May all orders will be required to be certified as rollings will fall in third quarter when the new system is scheduled to be fully operative, form 298, which has covered all applications for rated tonnage, fading from the picture. There is still some question as to continued application of form 169, which producers have been using in making up schedules for submission to Washington, about the tenth of each month for the month following. Plate producers, it is understood, would like this feature retained.

New York jobbers are buying plates more freely, although their purchases still fall well short of those of shipyards and fabricators in that district. Railroad equipment builders also are specifying a larger tonnage and report less difficulty getting plates than a month or so ago.

## Rails, Cars . . .

Track Material Prices, Page 141

The first important domestic freight car award for some time has been placed by the Norfolk & Western, subject to government approval, involving 1000 seventy-ton composite hoppers,

All the efficiency of larger Ross Coolers
PACKED INTO THIS SMALL, LIGHT "BCF" OIL COOLER
installed in
Verson
HYDRAULIC PRESSES
Complete story on the broad use of Ross "BCF" Coolers in the metal industries concisely told in
BULLETIN 4922
WRITE FOR YOUR Free Copy TODAY
ANOTHER ROSS OIL COOLER equipped Hydraulic Press
Manufacturers of All Kinds of Heat Exchangers for over a Quarter Century
ROSS HEATER & MFG. COMPANY, INC.

# *You Can Help* UNCLE SAM *Win This Fight!*

★ ★ ★ ★ WELDED products are leading America to victory! The speed of your plant's weld grinding may easily help determine Uncle Sam's ability to whip the axis in record time. Upon immediate delivery of welded war supplies now, depends the amount of material backing our boys at the front need and must have - at once!

Sterling's "Wheels of Industry" are doing a magnificient weld grinding job throughout the nation's steel mills. Tailor-made to the demands of each mill and manufacturing plant, Sterling Grinding Wheels are helping speed up production throughout all industry. Operators recommend them . foremen specify them!

When victory is finally won, proper weld grinding wheels will be ready to continue doing their part for more efficient, faster production for peace. To the goals of victory and peace, the concerted effort of every Sterling worker is dedicated.

May we help you realize peak production? A Sterling engineer will gladly call upon reques

· STERLING ABRASIVES ·

THE STERLING GRINDING WHEEL DIVISION

OF THE CLEVELAND QUARRIES COMPANY

TIFFIN, OHIO

THE WHEELS OF INDUSTRY

for delivery during second half. The order was divided equally between the Virginia Bridge Co., Roanoke, Va., a United States Steel Corp. subsidiary, and Bethlehem Steel Co., Bethlehem, Pa. Chicago & Alton is considering purchase of 500 composite hoppers.

The program for 44,000 domestic freight cars for last half is still considered likely to be approved by WPB, but until military requirements can be appraised more closely no definite domestic schedule is likely to be set up.

Locomotive plants in Canada have received a go-ahead order to build locomotives for India. The present order involves 145 locomotives of which Canadian Locomotive Co., Kingston, Ont., will build 75 and the other 70 will be turned out by Montreal Locomotive Co., Montreal, Que. The first engine is expected to be completed by Aug. 1, with final delivery of the completed contract by May, 1944. Priorities for steel have been arranged with full consent and active co-operation of the United States government. It is stated that the locomotives will be of special design, lighter than the usual freight engine and will serve a new railway line to be constructed in India.

## Pipe . . .

Pipe Prices, Page 141

Demand for lap-weld pipe has slackened and inquiries for industrial needs are few. More liberal arrangements for replacement of butt-weld with distributors has narrowed deliveries between lap and butt-weld and some mills are more extended on the latter. Warehouse stocks are better balanced and some price shading crops out from time to time. Substantial tonnages of pipe and tubing are required for shipbuilding and this is one outlet where demand tends upward. Much of this is covered by direct mill shipments.

For delivery at Norfolk, Va., Laclede Steel Co., St. Louis, is low on 237,833 feet of steel tubing. Seamless boiler tubes are not available before August with most producers.

## Structural Shapes . . .

Structural Shape Prices, Page 141

Somewhat better demand for structural steel is reported, with an increasing volume of new jobs coming up for bids on which approval has been placed by WPB. This reflects the trend toward liberalization in use of structural steel for buildings useful to the war effort or for permanent post-war construction. Small-lot structurals are also active, as evidenced by reports from warehouses that there is increased demand for maintenance and repair work. Sellers of used structural sections and second-grade material report a fairly active market, virtually all in small tonnage lots.

## Reinforcing Bars . . .

Reinforcing Bar Prices, Page 141

Advance indications are that May quotas probably will be somewhat below those of April on mill directives, with available tonnage from new billet steel less than April production. There is some confusion also in pricing bars and mill lengths, practice varying among producers in establishing a definition for mill lengths. Bids on recent jobs have varied from $2.15 per 100 pounds to $2.40.

## Pig Iron . . .

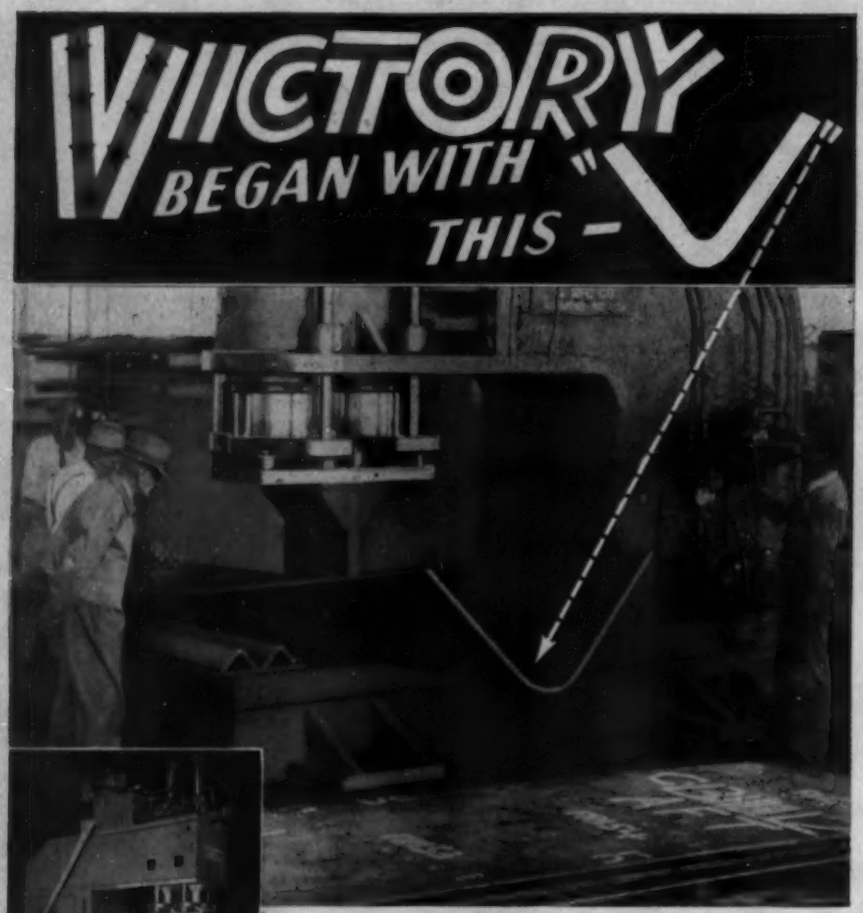
Pig Iron Prices, Page 142

Conditions in the pig iron market are easier, no difficulty being met in distribution to meet all needs. Requests for tonnage are more numerous but do not total as much as in recent months. Interruption and temporary suspensions of some lines of war work are expected to provide more iron for civilian use unless other essential production is speeded up.

One pig iron interest in northern Ohio states applications for May shipments will exceed any month since last August on a tonnage basis. This is said to reflect the increased needs resulting from higher operations of foundries serving the agricultural and railroad equipment industries.

Falling off in shipments to machine tool and cast iron pipe interests continues, while tapering in deliveries to a number of jobbing foundries has also developed recently. Many jobbing foundries have been doing subcontract war work, but changing emphasis on production of certain types of military equipment leaves this in a constant state of flux. Upturn in needs for other sources, however, will keep April shipments at the usual monthly level.

Few foundries have more than 30 days

*Beatty designs and builds heavy duty punches, shears, coping machines, forcing presses, extruding presses, hydraulic forming presses, bulldozers*

**Widely used by shipbuilders, and other fabricators of heavy metal, the Beatty 400-Ton Hydraulic Forming & Flanging Press has the power, speed and adaptability to break production bottlenecks. Of very latest design, this unit, with its unique type pump and valve design, eliminates the need for cooling coils, with their inherent threat of water entering the oil supply line. If you work in heavy metal, there is a Beatty machine to help smooth out your production wrinkles. Write us.**

HYDRAULIC PLASTIC METAL WORKING EQUIPMENT

BEATTY MACHINE AND MFG. COMPANY
HAMMOND, INDIANA

THE S F Co.

Lake Superior Iron Ores
Bessemer
Non-Bessemer
Aluminiferous

"Shenango" Pig Iron
Bessemer
Malleable
Basic — Foundry

The
SHENANGO
FURNACE
Company
Oliver Building, Pittsburgh, Penna.

W. P. SNYDER & COMPANY
Iron Ore • Pig Iron • Coal and Coke • Oliver Bldg., Pittsburgh, Penna.

D. O. JAMES
CONTINUOUS-TOOTH
HERRINGBONE GEAR

Triple Reduction
Continuous-Tooth
Herringbone Gear
Speed Reducer
(with cover
removed)

SPEED
REDUCERS

MEET THE DEMANDS AND
REQUIREMENTS OF INDUSTRY

Their great load carrying capacity, their very high efficiency and their continued proven performance indicates the engineering soundness of the design and manufacture of D. O. James Generated Continuous-Tooth Herringbone Reducers.

These units are the product of an organization with over a half-century of gear making experience and have a wide use in many different industries.

Catalogs are available containing complete engineering data, advantages, weights and prices.

D.O.James ESTABLISHED 1888
MANUFACTURING COMPANY
1140 W. MONROE STREET, CHICAGO, ILLINOIS

MAKERS OF ALL TYPES OF GEARS AND GEAR REDUCERS

CAN'T GET 'EM UP
*in the morning!*
It's those luxuriously comfortable
beds at all
DEWITT OPERATED HOTELS

*In Cleveland* HOTEL HOLLENDEN
*In Columbus* NEIL HOUSE
*In Lancaster, O.* THE LANCASTER
*In Corning, N. Y.* THE BARON STEUBEN
*Check* IN

THEO. DEWITT PRESIDENT

DeWITT OPERATED HOTELS

CHECK IN DeWITT

supply, although in most instances the inventory situation is substantially better than any time in recent months.

Pig iron allocations for May delivery in New England are featured by some revisions among sources of supply rather than material change in total tonnage, which for foundry grades tends slightly lower. Heavier load is being carried through May by the Everett furnaces; current output will be absorbed, supplemented by some tonnage from inventory. Two New York furnaces, down for relining and usually supplying part of New England tonnage, will be able to contribute less than usual. Pressure from gray iron foundries has eased, but steel works, malleable and the few steel foundries in the area maintain demand. While melters will frequently accept minor changes in analysis, high silicon basic and low silicon foundry are more difficult to move. Because of the nature of considerable war work textile mill equipment shops are melting less than during normal times and some jobbing foundries could handle more work.

## Scrap . . .

Scrap Prices, Page 144

Scrap consumers are receiving sufficient in practically all cases to meet their steelmaking needs without recourse to reserves but quality leaves much to be desired, light material from miscellaneous collections last fall continuing to come from yards. Special campaigns to uncover dormant material are being pushed and automobile wreckers are turning over their purchases of old cars as rapidly as their labor forces will permit. Unseasonable weather has delayed the usual spring increase in collections and many formerly in this occupation have abandoned it for other work giving a better return.

Auto wreckers in the Cleveland area shipped 10,311 tons of scrap during March, compared with 7888 tons in February. The same group purchased 4209 cars in March and reported 7233 tons of loose scrap on hand March 31. In the preceding month they purchased 3925 cars and had 8457 tons on hand at the close of the period. Cars on hand on March 31 totaled 13,113 compared with 13,858 Feb. 28.

Industrial plants in the Buffalo area responded to a cleanup request by gathering more than 9180 tons of steel and iron scrap from March 20 to April 15. A considerable portion was made up of turnings, which find a limited market. Two large consumers are taking in short turnings and dealers are able to dispose of some by including them in bales.

Scrap dealers in the St. Louis district find conditions difficult, even recent permission to advance wages 7 cents per hour not improving the labor situation materially. Some operators are likely to close their operations. Mills have sufficient tonnage but quality is poor and causes loss of too many heats of steel. Current receipts contain a large proportion of bundles, borings and turnings.

Except for heavy breakable, demand for cast scrap, including motor blocks, is slack in New England and foundries in numerous instances have the heaviest inventory in months. Heavy breakable is scarce and $17.50, f.o.b., is paid generally. Low phos scrap, mainly from shipbuilding, is sufficient to meet demand and $17.55, Boston, is paid, with lower prices ruling at other points, including Providence, R. I. Demand for open-hearth grades about equals production, with some allocations, but buying lacks snap. Remote material is subject to some shading against high freight charges. While demand is fair for short turnings, under stricter specifications for blast furnace use, machine shop and alloy turnings lag. Stove plate in small sizes is being bought by several blast furnaces.

## Warehouse . . .

Warehouse Prices, Page 143

Most jobbers are building up stocks, filling in voids, and getting a better balance on all steel items. Demand is increasing as a result of easing restrictions on many types of construction and there is a steadily increasing demand for maintenance and repair work, primarily on bars and structural items.

The new ruling on heat treated and alloy steels, which limits handling by warehouses, will have small effect on most sellers, except in certain districts, as these types of steel represent only a minor fraction of normal business.

The base quantity for cold-rolled strip out of warehouse at Boston is changed to 500 pounds and over, quoted at 4.725c. Under the zone price plan there are no longer uniform prices in the entire metropoltian Boston area. New prices quoted in STEEL are for delivery in the Boston freight terminal district or other points in the Metropolitan area where the freight rates are the same. There are several freight


LENGTHEN TOOL LIFE WITH CIRCULAR RELIEF GRINDING!

ONE MACHINE and ONE OPERATION
Does The Whole Grinding Job!

Today it is of paramount importance to save both tools and time. CIRCULAR RELIEF GRINDING can make your tools last longer, and simplify your grinding operations, too. This revolutionary new grinding method requires but ONE MACHINE and ONE OPERATION. By following the contour of the tool, no precious metal is needlessly cut away. Result: Fewer grindings needed, time is saved and tools last longer. Send for circular giving the whole story. You'll be glad you did!

Here's Why Tools Last Longer When CIRCULAR RELIEF GROUND:

Note from diagram how CIRCULAR RELIEF GRINDING follows curve of tool, grinds right up to cutting edge and does not cut away valuable metal supporting the cutting edge.

CLEVELAND
TOOL ENGINEERING COMPANY
9114 DETROIT AVE. • CLEVELAND, OHIO

# CLEANBLAST

## TEMPERED SHOT and GRIT

### ROUGH CLEANING TO DELICATE FINISH

"Cleanblast" is used by a large number of manufacturers in many applications ranging from rough cleaning of heavy steel or iron castings to the delicate finish required on finished gears after they are treated. It is also used in many cases on fabricated metal parts where blasted finishes are required . . . . .

## ALLOY METAL ABRASIVE COMPANY

311 W. HURON ST. ANN ARBOR, MICHIGAN

**EMPLOYEES' BADGES**
**NUMBERED BUTTONS**
**FIBRE TIME AND TOOL CHECKS**
**CELLULOID CASES**

*AIR MAIL—TELEPHONE—TELEGRAPH YOUR ORDERS!*

Three Long Distance lines, CEntral 4916-4917-4918.
After six p.m. PRospect 6778. HUdson 5211. CEntral 0379.
LARGE EQUIPMENT. EFFICIENT SUPERVISION.
50 Years' experience in back of us!
We are ready to serve 24 hours a day.

*Send for Catalog.*

**ST. LOUIS BUTTON COMPANY**
415 Lucas Avenue St. Louis, Mo.
No Orders Filled Without Priority Extension, Government Contract Number and final use.

## Pickling of Iron and Steel

*—By Wallace G. Imhoff*

**Price Postpaid $5.00**

This book covers many phases of pickling room practice and construction and maintenance of pickling equipment.

**THE PENTON PUBLISHING CO.**
*Book Department*
1213 W. 3rd St. Cleveland, O.
429-S

You can depend on Preformed "HERCULES" (Red-Strand) Wire Rope for maximum efficiency. Its long life means fewer replacements and more hours of work from each pound of steel used, thus saving both time and material. As "HERCULES" is available in both Round Strand and Flattened Strand constructions as well as in the Standard and Preformed types, there is, in this one grade, a right rope for every heavy-duty purpose.

*We would be glad to have you write for further particulars.*

MADE ONLY BY
**A. Leschen & Sons Rope Co.**
WIRE ROPE MAKERS • • ESTABLISHED 1857
ST. LOUIS, MISSOURI, U. S. A.
NEW YORK • CHICAGO • DENVER • SAN FRANCISCO • SEATTLE • PORTLAND

stations within the district which take different rates from Boston. In fact there are one or two subdivisions of the city itself with varying freight rates.

Revised warehouse steel price schedules for zones 5, 6, 7, 8 and 9 have been approved by OPA and are expected to be published about May 15. These zones will cover all the mid-western and some southern states.

## Iron Ore . . .

Iron Ore Prices, Page 143

Consumption of Lake Superior iron ore in March was 7,723,461 gross tons in the United States and Canada, according to the Lake Superior Iron Ore Association, Cleveland. This compares with 7,103,914 tons in February and 7,108,887 tons in March, 1942. The March total was not much below the all-time tonnage consumed in January, 7,765,174 tons, although one less blast furnace stack was in operation, 174 as of April 1 against 175 Feb. 1. Canada had nine stacks in blast April 1, giving a total of 183 for both countries. Eight stacks were idle in the United States at the beginning of April, with all Canadian furnaces blowing.

Total ore at furnaces and on Lake Erie docks April 1 was 25,088,209 tons, compared with 32,743,294 tons a month earlier and 20,189,294 tons a year ago. Of the furnace stocks 20,431,518 tons was held in the United States and 718,307 tons in Canada. Dock stocks in the United States were 3,938,384 tons.

Four ships operated by Pickands, Mather & Co., which had wintered at Duluth, started loading ore April 21 at Two Harbors, Minn., and were scheduled to await news of channels being broken through in Whitefish Bay and eastern Lake Superior.

MEXICAN GRAPHITE

*The Carburizer for Acid Open-Hearth Practice*

• With this Graphite product you can add carbon to your charge with complete confidence of securing over 70% recovery. Free from phosphorus and sulphur, you are assured of a better quality steel. Being the densest carbon obtainable, No. 348 Mexican Graphite takes up a minimum of furnace space. It is especially sized for rapid solution.

If you are working larger scrap heats—with scrap analyses none too stable, you may at least be assured of a specific carbon replacement, and, minus any foaming or gassy reactions. At the same time you will avoid clogged checkers, hot roofs, long heat time and soft heats . . . . the most soluble carbon obtainable . . . . Conveniently packaged, in 100 pound bags.

THE UNITED STATES GRAPHITE CO.

SAGINAW, MICHIGAN

U. S. A.


## Nonferrous Metals . . .

Nonferrous Prices, Page 145

New York—Nonferrous WPB officials and representatives of the lead industry will meet in New York, Tuesday, April 27, to consider the quantity of foreign lead to be released for May to supplement domestic supply. Meanwhile, demand is heavier.

May allocations of zinc now are being closed as production of high grade holds at a rate where reserves are still increasing. Washington officials, however, favoring larger accumulations of critical materials are not expected to relax controls on distribution.

The volume of copper allocated for May delivery is somewhat larger than expected with some consumers getting more tonnage than had been hoped for. Pressure for copper for strictly war requirements continues to ease somewhat. Domestic production is ahead of last year which, coupled with exports, maintains reserves at a satisfactory level for brass mill products.

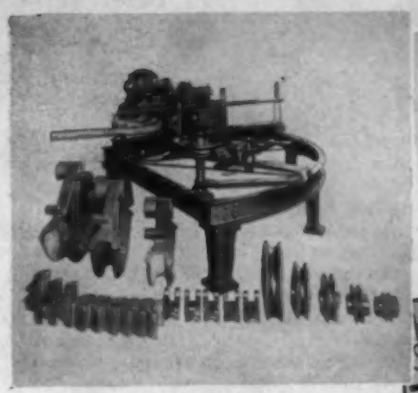
Orders bearing the program symbols N-1, O-1, and O-4 for May and June delivery, are to be accepted and produced only in accordance with detailed instructions which will be issued to each brass mill. Authorized controlled material orders for copper wire mill products, calling for May and June deliveries, must be accepted and scheduled in accordance with the provisions of CMP Regulation No. 1 ahead of orders bearing preference ratings only.

In the case of both brass mills and copper wire mills, the directions provide that where an order previously placed is converted into an authorized controlled material order, the effective date of the conversion is the date on which the allotment number is received by the producer. Delivery of such orders may be refused if the allotment number is not received in accordance with time limits for replacement of controlled material orders as established in schedule III of CMP Regulation No. 1.

## Pacific Coast . . .

Seattle—Rolling mills, operating under federal directives, are producing practically no reinforcing bars, for which demand is light. Merchant bars, angles, universal plate and chain steel are being turned out in large volume. Most of this demand comes from the shipbuilding industry, merchant bars and chain material being particularly strong. One plant in Portland, Oreg., is reported to be using 1500 tons of chain steel monthly.

Scrap supplies are ample and mill operators report no anxiety on this score. Excellent scrap is being received from the ship construction plants promising a steady source of supply. Much general scrap, gathered in drives during the winter, still lies untouched although scrap dealers have their plants working



Write Air Mail for printed matter
*Quick Deliveries*

**To Speed Victory!**
**WE ARE READY TO SERVE YOU**

**"American"**
**COLD PIPE, CONDUIT and TUBE BENDING MACHINES**

*Twelve types to select from.* Hand operated capacities ¼ to 6" inclusive. Motor operated ¾ to 8" inclusive.

*A few of our More Than 12,000 Customers:* Bureau of Ships, Wash., D.C.; Henry J. Kaiser Co., Calif.; Pacific Bridge Co.; Bethlehem-Hingham Shipyards; Hercules Powder Co.; Stone & Webster Engineering Corp.; E. I. Du Pont de Nemours & Co.

"American"
PIPE BENDING MACHINE Company INC
17 PEARL ST.
BOSTON, MASS.

**COWLES**

ROTARY SQUARING KNIVES
*for Modern Requirements*
Highest Quality . . . . . Long Service
*The Product of Many Years Specialization*
MADE BY TOOLMAKERS
*Also Manufacturers of*
MILLING CUTTERS AND
SPECIAL METAL CUTTING TOOLS

**COWLES TOOL COMPANY**
CLEVELAND, OHIO

**BEALL** KANT-LINK
**SPRING WASHERS**

KEEP BOLTED ASSEMBLIES
*permanently* TIGHT

BEALL Spring Washers compensate for wear, bolt-stretch, corrosion and break-down of finish. They meet rigid Army, Navy and Air Corps specifications. Available in Carbon Steel, Stainless Steel, Phosphor Bronze, Everdur and Monel Metal. Finished in Cadmium Plate, Galvanized, Silver and Parkerized. IMMEDIATE SHIPMENT of all standard sizes.

*WIRE US your requirements*
**BEALL TOOL CO.** (Div. Hubbard & Co.)
EAST ALTON, ILLINOIS

**GRINDING WHEELS AND THEIR USES**

**By Johnson Heywood**

Second Edition, completely revised. Sponsored by the Grinding Wheel Manufacturers Association. 436 pages, 29 chapters, 5 appendices, 436 illustrations and figures. Fully indexed. Price $3.00* Postpaid. (*plus additional 9c for state sales tax on orders for delivery in Ohio)

● The New Book of "KNOW HOW" that "TELLS HOW"—a practical volume for every man interested in modern grinding methods and applications.

Today's production, with a premium on "Know How", depends on men that can do a job, *or know where to find out how to do it.*

"Grinding Wheels and Their Uses" covers the entire field of grinding . . . a study of the twenty-nine chapter heads will show how broad its scope really is.

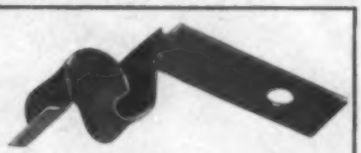
Shop executives can turn to this book for practical help on everyday grinding problems; grinding machine operators, or apprentice operators, can use it to good advantage. Students in trade and technical schools and colleges can profit from the operating experience of engineers, designers, foremen and employes as set forth in this new volume.

This 436 page book, with 29 chapters and 436 illustrations and figures is the only up-to-date book of its kind on the market today. Fifteen tables of Wheel Recommendations and 4 other appendices provide working data that every operator must have.

ORDER YOUR COPY TODAY!—Orders will be filled the same day received . . . Order your copy now and have this valuable handbook ready for immediate reference.

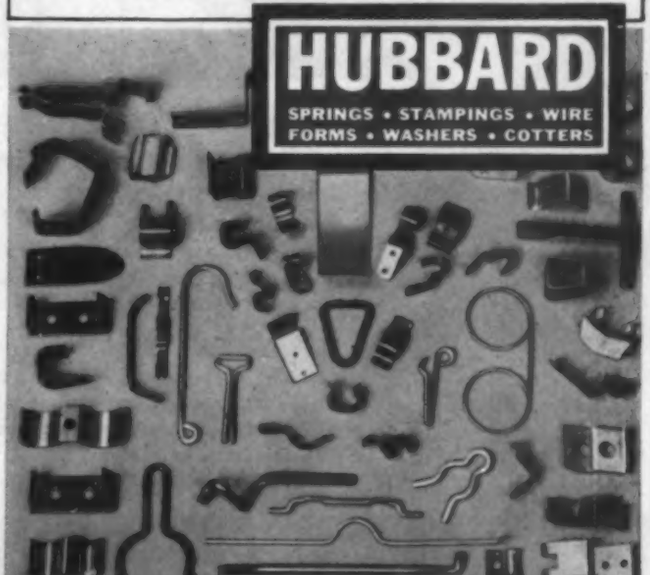
**STEEL — BOOK DEPT. — PENTON BLDG., CLEVELAND, OHIO**

**WIRE FORMS**



. . made in any material, any quantity, simple and intricate shapes to suit your specifications; or ask for suggestions on any design or manufacturing problems concerning your products where parts like these may offer a solution.

**M. D. HUBBARD SPRING COMPANY**
706 CENTRAL AVE.
PONTIAC • MICH.



to capacity to process this material.

There is no improvement in the structural shape market and fabricators are seeking new business. Demand for cast iron pipe is slow, due to inability to obtain priorities, although dealers are moving small lots out of stock for odd jobs. Warehousemen report a steady movement of everything but some items are extremely scarce and difficult to obtain.

Tacoma's second Nisqually power project is progressing but the city has hired expert help to solve the problem of costs, which greatly exceed original estimates. The city has engaged the services of Charles T. Main Co., Boston, and Engineer E. R. Chandler of that company's staff will work with Chief Engineer J. V. Gongwer, of the city's staff, in a survey and recommendations to expedite completion of the job. The first unit to produce 40,000 kw. is expected to be in operation by Oct. 15. The city council recently provided $14,000,000, the original estimate having been $11,000,000, and latest figures indicate the final cost will be $17,000,000.

Seattle's former street car system is furnishing large tonnages of scrap steel rails, a contract having been awarded to take up 76,500 lineal feet and bids are called for April 29 for a section involving 28,000 feet.

Beckett & Bridges, Portland, Oreg., have award to install a craneway at Kaiser's Swan Island shipyard. The Kaiser Oregon Shipbuilding Corp. will erect at once an $85,000 personnel building at the plant, contract placed with Wegman & Son, Portland, Oreg.

## Canada . . .

**Toronto, Ont.**—Canada is entering upon a new phase in its war production program, one that is expected to be reflected in further expansion in iron and steel consumption. In future, the Canadian war industry will place less stress on production of weapons and equipment and proceed with greater production of war and cargo ships, aircraft and radio equipment. Production of rolling stock also is to be speeded up and Canadian plants have closed large orders from the Canadian Pacific and also for export to India. During the past week there was some improvement in order placing. Local mill representatives report heavy outpouring of new orders, both through government purchasing agents and private enterprise.

Supply of plates and sheets under the new war production phase already is of special concern and while mills are maintaining output to the limit of their capacity, it is stated that imports from the United States will have to be increased, if the full program is to be successfuly carried out. A substantial jump in plate consumption is predicted for the enlarged shipbuilding. It is reported that rolling stock builders are being alloted larger tonnages of plates and other steel materials and deliveries are being speeded. Marine boiler makers also have been more active recently and it is stated that plate consumption on this account has more than doubled since a year ago.

Merchant bar sales showed sharp gain in volume during the week, and inquiries indicate that business will continue at a brisk pace for some time. Most of the new bookings, however, call for delivery this quarter. Reports were circulated during the week to the effect that some war plants are running short of some special bars, but there is no actual shortage of carbon bars for war consumers. Consumers' inventories of bars are below those for the beginning of the year and they are having difficulty adding to stocks.

Local dealers state that receipts of steel scrap continue to improve and they are steadily building yard accumulations for future sorting and shipping. However, there has been no betterment in supply of cast scrap and stove plate, while malleable is almost entirely off the market. Mill deliveries are improving and it is now believed that sufficient steel scrap will be available to carry through to the summer without reduction in steelmaking operations. As far as iron scrap is concerned dealers state they are unable to fill all demands of consumers and no stock accumulations are on hand.

## Steel in Europe . . .

**London**—(*By Radio*)—Pressure is being maintained for all classes of steel products in Great Britain. Plate tonnage required for tanks and boilers is increasing steadily. Steel mills are booked heavily until the end of first half and deliveries on current buying can not be promised until third quarter. Improved demand is coming out for bar iron. Hematite pig iron supply is light and considerably below requirements.

**CUTTING STANDARD STEEL SHAPES at the Douglas Aircraft Company's new Long Beach Plant . . .**

MARVEL Saws were chosen to help the "production of the largest possible number of the finest possible airplanes in the shortest possible time."

In the great new "blackout" Douglas Aircraft Co., plant where even the doors are light trapped and even the brightest moonlight can find no reflection surface—where every piece of equipment is the finest, MARVEL SAWS are found at strategic points, helping to speed the production of the world's most powerful bombers.

ARMSTRONG-BLUM MFG. CO. *"The Hack Saw People"*
5700 Bloomingdale Ave., Chicago, U. S. A. Eastern Sales: 225 Lafayette St., N. Y.

# *Modern* ANALYSIS

. . . SPECTRO ANALYSIS
. . . CARBON DETERMINATION
. . . SULPHUR DETERMINATION

CARBON DETERMINATOR

Carbon Determinator provides accurate and rapid carbon determination of ferrous and non-ferrous materials, well within A.S.T.M. specifications for control work . . . and within two minutes.

Sulphur Determinator provides accurate sulphur determination . . . within three minutes.

Complete line of spectrographic equipment and accessories. Designed to meet the exacting needs of modern research or control analysis.

SPECTROGRAPH

*Write for Information*

**HARRY W. DIETERT CO.**
9330 ROSELAWN AVENUE · DETROIT, MICHIGAN

THE MOTCH & MERRYWEATHER
NOTE ALTERNATE SINGLE AND DOUBLE CHIPS
Triple-Chip METHOD OF COLD SAWING METAL
DOES More WORK Faster!

Good, clean, accurate work, too—the only kind you can afford to do for Uncle Sam or anybody else. Clean cutting without chatter, without burrs, without scrap. Production up to 1-1/2 times previous highs. Two machines (No. 3 and No. 4) handle round stock up to 16", squares to 14-1/2"; single or multiple cutting of practically any metal, ferrous or non-ferrous. Only Motch & Merryweather builds all 3: cold saw, blade, and blade sharpener. Bulletin.

*Ask for our 12-page, well illustrated Blade Bulletin "S-5"*

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
Penton Building · Cleveland, Ohio

*Built by* MOTCH & MERRYWEATHER

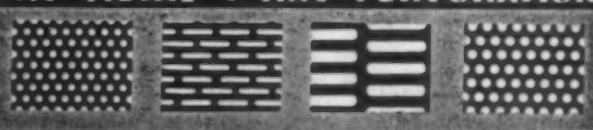
Promptly made to your exact specifications. We can furnish any size or style of perforations desired.

CHICAGO PERFORATING CO.
2443 W. 24th Place Canal 1459 Chicago, Ill.



# SCREENS
## of Perforated Metal

ANY METAL • ANY PERFORATION



The Harrington & King PERFORATING CO.

5634 Fillmore St., Chicago, Ill.
New York Office—114 Liberty St.



ASK FOR INFORMATION AND QUOTATIONS ON

OHIO

LIFTING MAGNETS—Improved Design—Greater Lifting Capacity
SEPARATION MAGNETS—Stronger Pulling Capacity
MAGNET CONTROLLERS—With Automatic Quick Drop

THE OHIO ELECTRIC MFG. CO.
3904 MAURICE AVE. CLEVELAND, OHIO



# HENDRICK

## PERFORATED METALS

Hendrick follows your instructions accurately, whether for a simple machine guard, or an intricate small-hole punching in stainless steel, or other corrosion resisting material.

HENDRICK MANUFACTURING CO.
37 Dundaff Street Carbondale, Pa.
Sales Offices in Principal Cities
*Please Consult Telephone Directory*
Manufacturers of Mitco Open Steel Flooring; Elevator Buckets; Light and Heavy Steel Plate Construction



## SIMONDS! FRONT AND CENTER!

FOR HONEST SERVICE, QUALITY WORK AND DEPENDABLE PRODUCTS, EXTENDED TO THE GEAR, CHAIN DRIVE AND COUPLING USERS OVER A PERIOD OF HALF A CENTURY, ACCEPT THE APPRECIATION AND ESTEEM OF YOUR CUSTOMERS, PAST AND PRESENT. MAY YOUR NEXT 50 YEARS BE AS USEFUL AS THE PAST 50!

(SIGNED)

*Consumers of Simonds gears, drives & couplings*

THE SIMONDS GEAR & MFG. CO.
25TH STREET, PITTSBURGH, PA.

# NEW BUSINESS

**Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending**

## SUB-CONTRACT OPPORTUNITIES

**Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.**

**Minneapolis Office, Contract Distribution Branch of WPB, 334 Midland Bank building, is seeking contractors for the following:**

**No. S-410:** Bushing clamp nut and bushing. Chicago prime seeks screw machine and milling machine facilities to produce these two pieces. Material is brass. Quantity, 54,000 of each, 42,000 by May 1. Tolerance, 005. Priority, AA-1. Price negotiated.

**No. S-412:** Anchor chain. This is 1½-inch anchor chain with stud link. Links are 7⅛-inches long, 4½ inches wide and weigh about 15 pounds. Sixty-four 15-fathom shots are wanted, 960 fathoms in all. Material is wrought iron. Priority, AA-1. Early delivery. Prices negotiated.

**No. S-414:** Aircraft engine parts. Items are exhaust valve seats, check valves and two types of oil seal rings. Quantities are large and will be increased through 1944. Materials are chrome-nickel steel, bronze, etc. Aircraft tolerances. Priority AA-1. Deliveries to start at once.

**No. S-415:** Small machine gun parts. Twenty-eight small parts, require automatic screw machines. Quantities are from 100 000 to 500,000 of each. Material is furnished and is ready to ship. Commercial tolerances. Priority, AA-1., 4.90. Early delivery is urgent.

**No. S-397:** Drawings and specifications have been filed by a Wisconsin prime, covering a number of small parts, studs, bolts, valve guides, etc. Quantities are substantial and repeat orders may be expected. Material supplied on many items.

**Detroit office, Contract Distribution Branch, Production Division, WPB, Boulevard building, is seeking contractors for the following:**

**Job No. 5417:** Turret drive pump. Quantity, 500,000. Equipment, automatic screw machine, sensitive drill, tapper, heat treat, external grinder. Dimensions, 7/16-inch O.D. ⅝-inch long. Tolerances, plus or minus .0001.

**Job No. 5491:** Rocker arm pin. Quantity, 200,000. Manganese steel, .297 diameter, is furnished. Equipment, automatic screw machine, heat treat, hand screw machine, centerless grinder. Dimensions, 5/16-inch O.D. x 1 7/32-inch long. Tolerance, plus or minus .003.

**Job No. 5827:** Flange. Steel furnished in 16-foot sticks. Equipment, turret lathe with 11½-inch hole in spindle or lathe 14 x 16 inches, heavy-duty drill. Dimensions, 11⅝ inches O.D. x 1 9/16-inch long.

**Job No. 5817:** Cable terminal. Quantity, 10,000. Material furnished. Equipment, hand screw machine. Dimensions, 25/32-inch O.D. x 3 29/64 inches long. Tolerance, plus or minus .010.

**Job No. 5773:** Fuze seat, Quantity 100,000. Material, SAE-1030 steel. Equipment, automatic screw machine, chucking machine or hand screw machine, horizontal or hand mill. Dimensions, 3 inches O.D. x 1½-inch long. Tolerance, plus or minus .004.

**Job No. 5732:** Machined part. Quantity, 5000. NE-8739 steel is furnished. Equipment, turret lathe, horizontal mill, surface grinder, heat treat, external grinder, polish spindle. Dimensions, 1 9/16 x 13/16 x 1 3/16-inch overall.

**Job No. 5560:** Bushing. Quantity 30,000. Material, aluminum. Equipment, hand screw machine, sensitive drill, external grinder. Dimensions, 1 7/16-inch O.D. x 47/64-inch long. Tolerance, plus or minus .00025, 50 prof.

**Job No. 5563:** Stud. Quantity, 19,800. Material, AMS-6310 steel. Equipment, hand screw machine, heat treat, thread grinder, cadmium plate. Dimensions, 5/16-inch O.D. x 1 ⅝-inch long. Tolerance, plus or minus .0013, 50 prof.

**Job No. 5569:** Pipe plug. Quantity, 300,000. Material, ANS-14 steel. Equipment, automatic screw machine, horizontal mill, sensitive drill. Dimensions, 7/16-inch O.D. x 37/64-inch long. Tolerance, plus or minus .0015.

**Philadelphia Office, Contract Distribution Branch, Production Division, WPB, Broad Street Station building, reports the following subcontract opportunities:**

**Buescher-15-1:** A government agency requires facilities for casting three low-pressure steam engine cylinders. Deliveries 90 to 120 days. Approximate dimensions, 9 x 8 x 9 feet, weight, 30,000 pounds. Material, cast iron. Patterns furnished. Drawings at Philadelphia office.

**Buescher-15-2:** A government agency requires sixteen 36-inch and eight 34-inch single-face composition gate valves. Overall dimensions of 34-inch valve, length 101 ⅝ inches width 42⅛ inches, thickness 17 inches; 64-inch vertical mill required to face valve. Overall dimensions 36-inch valve, length 111 inches, width 44⅛ inches, thickness 17 inches; 65-inch vertical mill required to face valve. Drawings at Philadelphia office.

**Buescher-10-1:** A Pennsylvania manufacturer requires additional facilities for production of chain fittings in sizes from ¾ to 2¾ inches. Material will be furnished by prime contractor for at least a portion of requirements. Dies to be supplied by subcontractor. Die blocks will be available for die sinker. Equipment, 1000-pound to 8000-pound drop forge hammers. Prints, specifications and samples at Philadelphia office.

**Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:**

**SC-88:** Tool designing and manufacturing facilities for handling contour milling cutters, machine and assembly jigs and fixtures, for small items of various types of metals. High rating. Continuous production. Reference, 1-A-858.

**New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:**

**S-15-21581:** A Cleveland, O., manufacturer seeks a subcontractor who can machine aluminum forged fittings in various sizes, 9/16-inch being the largest. Equipment needed, Potter & Johnson. New Britain or Goss & Deleuw automatic lathes.

**S-15-21910:** A New York state prime contractor requires boring and planing facilities to machine cast iron cylinders for steam engines. There are three types of cylinders, low, medium and high. Specifications are as follows: Height 73½ inches for all three; width all three 93½ inches; bore length all three 63 inches; depth, low 103½ inches, medium 72 inches, high 79½ inches; bore diameter, low 70 inches, medium 37⅝ inches, high 28¼ inches. This is a rush job.

## STRUCTURAL SHAPES . . .

### SHAPE CONTRACTS PLACED

200 tons, superstructure, bridge, Louisville & Nashville railroad, Big Sandy river, Tennessee Valley Authority project, to Mt. Vernon Bridge Co., Mt. Vernon, O.

## REINFORCING BARS . . .

### REINFORCING STEEL PLACED

500 tons, Panama, sch. 6866, to Connors Steel Co., Birmingham; bids March 19, delivery 2-10 days.

239 tons, Panama Canal Zone, to Judson Steel Corp., Emeryville, Calif.

103 tons, highway bridge, Pulaski road, over Belt railroad, Chicago, for Illinois State Highways division, to Bethlehem Steel Co., Bethlehem, Pa.; Ready Coal & Construction Co., Chicago, contractor; bids March 19.

### REINFORCING STEEL PENDING

160 tons, addition to Veterans' Hospital, Coatesville, Pa.; J. D. Hedin, Washington, low on general contract.

## PIPE . . .

### CAST PIPE PLACED

480 tons, 6, 12 and 16-inch, Bristol, Conn., to Warren Foundry & Pipe Co., Everett, Mass.

## RAILS, CARS . . .

### FREIGHT CARS PLACED

Norfolk & Western, 1000 seventy-ton composite hopper cars, divided equally between Virginia Bridge Co., Roanoke, Va., and Bethlehem Steel Co., Bethlehem, Pa., subject to government approval.

Southern Railway, 1450 hoppers, to Pullman-Standard Car Mfg. Co., Bessemer, Ala.; Subject to government approval.

### FREIGHT CARS PENDING

Chicago & Alton, 500 composite hopper cars; contemplated.

### BUSES BOOKED

Twin Coach Co., Kent, O.: Eleven 43-passenger for Seattle Transit System, Seattle; seven 41-passenger for United Electric Railways Co., Providence, R. I.; two 44-passenger for Georgia Power Co., Atlanta, Ga.

## GRUENDLER CRAFTSMANSHIP

*Employed by U. S. A. in the WAR EFFORT*

**Make "Chips" and Shovelling Turnings**

*with the Profitable*

**GRUENDLER "STEEL TURNINGS" CRUSHER**

Large quantities of long steel and high carbon steel turnings, long coils of brass alloys can be readily reduced to uniform "chips" which are easier to handle, bringing a higher price.

*"Pays for Itself in Little Time"*

GRUENDLER TURNINGS CRUSHER WITH THE EXCLUSIVE PATENTED SAFETY TRAMP IRON CATCHER . . . SEND FOR FACTS AND BLUE PRINTS. Built from 1 ton per Hr. to 8 tons per Hr. capacity

GRUENDLER

ST. LOUIS, U.S.A.

GRUENDLER

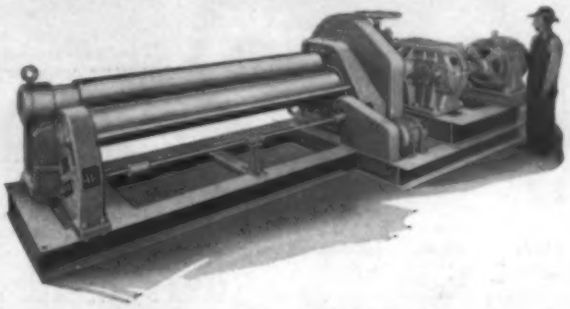
OUR FIFTY-EIGHTH YEAR

GRUENDLER CRUSHER & PULVERIZER CO.

PLANT and MAIN OFFICE — 2915-17 N. MARKET • ST. LOUIS, MO.

## WEBB

**PLATE BENDING ROLLS**



**PYRAMID and INITIAL TYPES**

Various Sizes and Capacities

**Prompt Delivery on Standard Sizes**

Special Machines Built to Order

★

*Write for Bulletin*

**THE WEBB CORP.**

*Manufacturers*

WEBB CITY, MO.

## CONVERSION FACILITIES AVAILABLE

for prompt rolling of billets into bars up to 3½" Rounds, 3" Squares and 4" x 2" Flats

THE MILTON MANUFACTURING COMPANY — MILTON, PA.

## INDUSTRIAL TRUCKS AND TRAILERS

Caster and Fifth Wheel Types

THE OHIO GALVANIZING & MFG. CO.

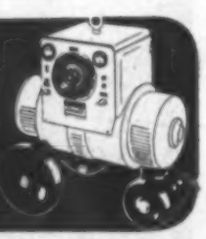
Penn St., Niles, Ohio

*For Greater Output, use...*

Features like balanced design, end-to-center cooling, 4-pole exciter, straight or reverse polarity at the flip of a switch, dual control for 1,000 "heat" combinations and Remote Control . . . all make Hobart a giant at its work. HOBART BROS. CO., Box ST-433, TROY, O.

HOBART... *One of the World's Largest Builders of Arc Welders*

## HOBART ARC WELDERS



*Free Catalog sent on request*

*We are* **DESIGNERS & MANUFACTURERS** *of*

**SPECIAL MACHINERY, DIES, TOOLS, JIGS AND FIXTURES**

37 years of experience and many satisfied customers represent our qualifications. Our trained engineers will be glad to discuss your production machinery problems—without obligation.

THE COLUMBUS DIE, TOOL & MACHINE CO.

COLUMBUS, OHIO

GASOLINE – DIESEL

## OHIO LOCOMOTIVE CRANES

STEAM – ELECTRIC

The OHIO LOCOMOTIVE CRANE Co. BUCYRUS OHIO

## L-R FLEXIBLE COUPLINGS

A complete line of non-lubricated flexible couplings—a size and type for practically every purpose. Sales offices in principal industrial centers. (See Classified Directory) or write main office and factory for engineering data and catalog.

LOVEJOY FLEXIBLE COUPLING CO., 4973 West Lake St., Chicago, Ill.

# CONSTRUCTION AND ENTERPRISE

## MICHIGAN

DEARBBORN, MICH.—Navarre Die & Tool Co., 10501 Haggerty, has let contract to Myles Standish, contractor, 49 West Hancock avenue, to erect building for manufacture of drop forge dies, 13864 Elmira, Detroit, costing $15,000.

DETROIT— Square Tool & Die Co., 21526 Hoover road, will build factory addition, costing $40,000. Adler Contracting Co., 13115 Cloverdale avenue, contractor; C. Howard Crane, 112 Madison avenue, architect.

DETROIT—Square Deal Die & Mfg. Co., 21626 Hoover road, will build factory, office and laboratory buildings. Adler Contracting Co., 12115 Cloverdale avenue, contractor.

DETROIT—Aluminum Co. of America, 3311 Dunn road, will build addition to metal storage building. Jos. Krausmann Co., 1460 East Jefferson avenue, contractor.

DETROIT—Letts Drop Forge Co., 2714 West Jefferson avenue, will construct factory building at estimated cost of $10,000. Barton-Malow Co., 2631 Woodward avenue, contractor.

DETROIT—John R. Winter, 18012 Wildemere avenue, will build factory addition at estimated cost of $35,000. Campbell Construction Co., 3255 Goldner avenue, contractor.

DETROIT—Draper Motors Corp., 9680 Grinnell street, has been incorporated with $150,000, to engage in tool, die and stamp work; Correspondent, Dean A. Draper, 9680 Grinnell street.

DETROIT—Aviation Tool & Gauge Co. Inc., 24490 Telegraph road, Bedford Station, Detroit, has been incorporated with $50,000 capital to deal in tools, dies, etc. Correspondent, William Z. Miller, R. No. 1, Birmingham, Mich.

DETROIT—Reamer Mfg. Co., 19660 Eight-Mile road West, has been incorporated with $50,000 capital to deal in hand and machine tools and supplies. Correspondent, R. H. Wolfe, 17605 Muirland avenue, Detroit.

FRASER, MICH.—AA. Tool & Mfg. Co., 31471 Utica road, has been incorporated with $20,000 to do tool and die manufacturing. Correspondent, Achiel Van Kerrebroeck, 5510 Maryland avenue, Detroit.

MT. CLEMENS, MICH.—Charles L. Petch Tool & Die Co., 2769 Harper, has been incorporated with $60,000 to deal in tools, dies, etc.; Charles L. Petch, 2769 Harper, correspondent.

PONTIAC, MICH.—Die Typing Corp. will erect steel boiler house for plant. Estimated cost, $50 000. Haberkorn Barry Co., 719 Boulevard building, Detroit, contractor; H. E. Beyster Corp., 3-135 General Motors building, Detroit, architect.

SAGINAW, MICH.—Morris Nover Iron Co., 909 North Washington avenue, will build office and warehouse. R. C. Hendrick & Son, 427 Atwater street, Detroit, contractors.

## MASSACHUSETTS

LEOMINSTER, MASS.—G. P. Harvey & Son, 40 Spruce street, will build three-story, 50 x 90-foot machine shop addition. F. I. Worthen, 20 Pearl street, contractor. Estimated cost, $40,000.

## CONNECTICUT

DANBURY, CONN.—H. Wibling Tool & Mfg. Co., 116 Walker street, New York, has awarded contract to Rudolph Construction Co., 17 Kimberly place, New Canaan, Conn., for plant addition and alterations. Estimated cost, $40,000.

FAIRFIELD, CONN.—Aluminum Co. of America, 2190 Post road, will build core cooling plant, factory addition, costing $65,000. E. Moss & Son Inc., 555 Grant street, contractor.

NEW HAVEN, CONN.—Marlin Fire Arms Co., 79 Willow street, will build two-story, 85 x 127-foot factory, costing $55,000. Kelley-Wood Co., 76 Center street, contractor; Arthur J. Hocking, 79 Willow street, engineer.

## OHIO

CLEVELAND—Chase Brass & Copper Co., W. L. Smith, superintendent, 1155 Babbitt road, Euclid, O., has plans by Smith, Hinchman & Grylls, Marquette building, Detroit, for one-story, 120 x 240-foot, factory addition, costing $100,000.

CLEVELAND—Hydraulic Equipment Co., Hail Kirkham, president, 1100 East 222nd street, Euclid, O., was awarded $85,000 contract by Defense Plant Corp. for equipping its war plant.

CLEVELAND—Linderme Tube Co., Emil M. Linderme, vice president and treasurer, 1500 East 219th street, Euclid, O., will erect storage building to cost $15,000.

CLEVELAND—Westinghouse Electric & Mfg. Co., W. F. White, manager, 1216 West Fifty-eighth street, has been granted priorities for alterations to foundry building to cost $200,000.

CLEVELAND—Builders Structural Steel Co., Jacob Friedman, president, 2880 East


**SAVE VALUABLE WORK HOURS**

Perkins Man Coolers keep men cool. Comfortable workers produce more. Give them a steady re-circulation of air.

Perkins Man Coolers are made in stationary and oscillating types, both portable.

**B. F. PERKINS & SON, INC.**

*Engineers and Manufacturers*

**Holyoke, Mass.**

**PERKINS MAN COOLERS**

TRADE MARK REGISTERED UNITED STATES PATENT OFFICE

**WIRE**

Iron — Steel — Alloy
Round — Flat — Shapes
*All Sizes and Finishes*
Also Wire Screen Cloth
**The Seneca Wire & Mfg. Co.**
Fostoria, Ohio

**RYERSON**
**CERTIFIED STEELS**
Over 10,000 kinds, shapes, sizes . . . uniform high quality . . . prompt, personal service. Write for Stock List. Joseph T. Ryerson & Son, Inc. Steel Service plants at: Chicago, Milwaukee, St. Louis, Detroit, Cincinnati, Cleveland, Buffalo, Philadelphia, Jersey City, Boston.

Immediate Shipments of
**BARS-PLATES SHAPES-SHEETS**
From Stock
*We Also Offer*
QUICK SHIPMENTS OF FLAME CUT PLATES IN IRREGULAR SHAPES, CIRCLES, DISCS, ETC.
**DAVID SMITH STEEL CO. INC.**
234 46th St. Brooklyn N.Y.

Since 1774
**TOOL STEEL PROGRESS**
**WILLIAM JESSOP & SONS, INC.**
Principal Office: 627-629 Sixth Ave., New York City
CHICAGO · BOSTON · DETROIT · TORONTO

THE MARK **"DARWIN"** OF QUALITY
PIONEERS OF MODERN QUANTITY PRODUCTION
ALLOY - TOOL - STEELS
DARWIN & MILNER, INC 1260 W. 4TH ST CLEVELAND O

**BELMONT** PHILADELPHIA **IRON** NEW YORK **WORKS** EDDYSTONE
*Engineers - Contractors - Exporters*
STRUCTURAL STEEL—BUILDINGS & BRIDGES
RIVETED—ARC WELDED
BELMONT INTERLOCKING CHANNEL FLOOR
*Write for Catalogue*
Main Office—Phila., Pa. New York Office—44 Whitehall St.

*Producers of*
**STAINLESS AND ALLOY STEELS**
*EXTENSIVE FACILITIES FOR LARGE FORGINGS*
**BARIUM STAINLESS STEEL CORPORATION**
*Canton, Ohio*

PIPE SHEETS WHEELING STEEL WIRE TIN PLATE
AND **Ductilite**
WORLD'S FOREMOST TIN PLATE
**WHEELING STEEL CORPORATION**
WHEELING, WEST VIRGINIA

*Advertise* **IN STEEL** . . . The "Used and Rebuilt Equipment" section is the weekly meeting place for buyers and sellers of good used or surplus machinery and supplies. Displayed classified rates are moderate. Send your instructions today to STEEL, Penton Building, Cleveland.

Thirty-fourth street, is endeavoring to obtain priority for a $25,000 storage building at 2935 East Thirty-fourth street.

CLEVELAND—Aircraft Nut Co., G. C. Forstner, manager, 2029 East 102nd street, is having machine shop conversion made.

CLEVELAND—Draper Mfg. Co., 8806 Crane avenue, S. will have plant addition, one-story, 40 x 25 feet, built by Mitzel Co.

CLEVELAND—Cloyes Gear Works, 17214 Roseland avenue N. plans warehouse addition. Edward G. Hoefler, engineer.

MASSILLON, O.—Canton Drop Forging & Mfg. Co., C. A. Brauchler, president, 207 Twelfth street, is negotiating with Defense Plant Corp., Washington, for a $4,000,000 contract to finance factory here producing aluminum forgings. New plant will utilize old Fort Pitt Bridge works shop on State avenue, Northwest, in addition to new buildings to be erected.

MIDDLEFIELD, O.—Geauga Die & Mold Co., Frank Hrebek, president, is erecting plant to manufacture tools, dies and molds. Correspondent, Frank Hrebek, Columbia Rubber Mold Co., 968 East Sixty-ninth place, Cleveland.

TOLEDO, O.—N. M. Hansen Mfg. Co., 1506 Foster avenue, will build another structure on its property.

### PENNSYLVANIA

ERIE, PA.—National Erie Corp., Sixteenth and Cascade streets, will erect addition to foundry building at cost of $200,000. Sassinghaus & Ostergard, Erie, builders.

PITTSBURGH—Kerotest Mfg. Co., 2500 Liberty avenue, has awarded contract for plant alterations to B. L. Winner Co. Inc., 2440 Maple avenue. Stanley L. Roush, Chamber of Commerce building, architect.

PITTSBURGH—Westinghouse Electric & Mfg. Co., George H. Parkman, director of building construction, Maloney building, has awarded contract to build one-story, 102 x 225-foot building to Landau Bros. Building Co., 125 First avenue. H. Heilman, Maloney building, architect.

### WISCONSIN

MANITOWOC, WIS.—Heresite & Chemical Co., Manitowoc, has plans by F. W. Raeuber, 926 South Eighth street, for one-story, 60 x 140-foot factory addition.

MILWAUKEE—A. O. Smith Corp. is negotiating for 55-acre site near West Capitol drive and Highway 100, on which to erect large plant for manufacture of airplane propeller blades. Project to be financed by government.

MILWAUKEE—Falk Corp., 3001 West Canal street, will build two-story, 25 x 47-foot, factory addition. R. L. Wright, care owner, architect.

### CALIFORNIA

BERKELEY, CALIF.—Linde Air Products Co., 1150 Eighth street, will build factory addition.

LOS ANGELES—Coast Centerless Grinding Co., 761 East Slauson avenue, will erect factory, 82 x 130 feet, 5709 South McKinley avenue, to cost $18,200.

LOS ANGELES— Cooper Screw Mfg. Co., 2457 Enterprise street, will erect 130 x 200-foot factory at 4456 Worth street, City Terrace, Los Angeles, at cost of $34,000.

SAN GABRIEL, CALIF.—Kanig Mfg. Co., 415-417 South San Gabriel boulevard, will construct building approximately 50 x 75 feet.

VERNON, CALIF.—Aluminum Co. of America, 5151 Alcoa avenue, will extend forge building 9A, 120 x 320 feet, at cost of $115,000.

### CANADA

DELORO, ONT.—Deloro Smelting & Refining Co. Ltd., R. A. Elliot, manager, will let contracts soon for plant addition to cost with equipment about $28,000.

NIAGARA FALLS, ONT.—North American Cyanamid Ltd., Fourth street, has plans for plant addition to cost about $20,000.

OSHAWA, ONT.—Duplate, Canada Ltd., First avenue, has given general contract to Milne & Nicholls Ltd., 57 Bloor street West, Toronto, for plant addition, one story, 100 x 200 feet, to cost $50,000. Allward & Gouinlock, architects, 57 Bloor street West, Toronto.

HULL, QUE.—Hull Iron & Steel Foundry Co., Montcalm street, has given general contract to Brunet & Fils, Aylmer road, for further plant addition to cost, with equipment, $300,000.

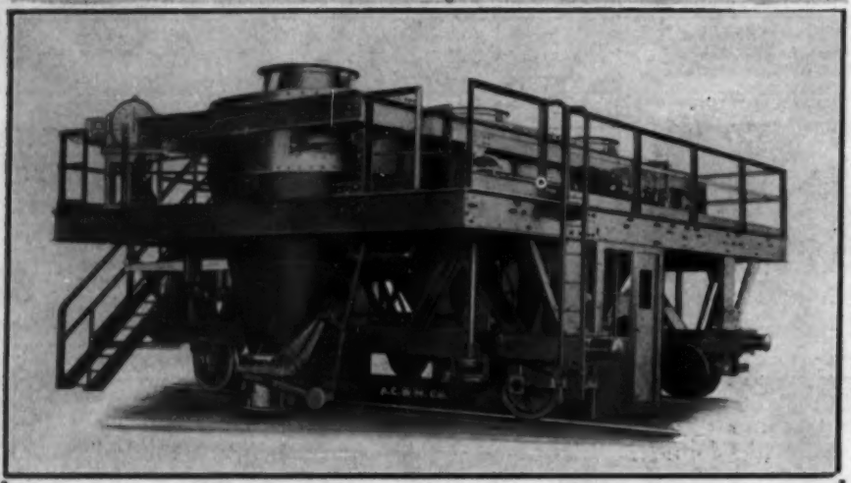
JOLIETTE, QUE.—Joliette Steel Ltd., Laval street, has started preliminary work on plant addition to cost about $20,000. Purdy & Henderson Co. Ltd., 1414 Crescent street, Montreal, general contractor.

MONTREAL, QUE.—McCruer, Fortier & Meyers Ltd., 1971 Tansley street, has given general contract to Sutherland Construction Co. Ltd., 1440 St. Catherine street West, for plant addition to cost $30,000.

MONTREAL, QUE.—Metal Heat Treating Co., 3100 Rouen street, Pierre Journet, manager, plans plant addition at Moreau and Rouen streets, estimated to cost, with equipment, about $50,000.

MONTREAL, QUE.—Canadian Car & Foundry Co. Ltd., 621 Craig street West, is receiving bids through Spence & Burge, architects, 2063 Union avenue, for plant addition at Dominion Works, Ville St. Pierre, to cost $75,000.

COKE OVEN EQUIPMENT



COAL CHARGING CARS

Atlas coal charging cars are preferred equipment on most ovens because they are designed to suit operating conditions exactly, and include those design features which insure dependable operation with low maintenance.

* * * * *

ATLAS COKE OVEN EQUIPMENT

Clay Carriers · Charging Cars · Door Machines
Coke Guides · Quenching Cars and Locomotives

The ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1100 IVANHOE RD. CLEVELAND, OHIO, U. S. A.

WILLIAMS

DROP-FORGINGS

ANY SHAPE • ANY MATERIAL • COMPLETE FACILITIES

Write for Free Forging Data Folder. Helpful, Informative

J. H. WILLIAMS & CO., "The Drop-Forging People" BUFFALO, N.Y.

Write for Prices and Delivery on Natco

LONGER LENGTH SLEEVES and RUNNER BRICK

also on other types of

NATCO POURING PIT REFRACTORIES

More than 50 years experience in the manufacture of quality clay products

NATIONAL FIREPROOFING CORPORATION

GENERAL OFFICES - PITTSBURGH, PA.

Manufacturers of Natco Insulating Refractory Brick

SMALL ELECTRIC STEEL CASTINGS

(Capacity 500 Tons Per Month)

WEST STEEL CASTING CO.

CLEVELAND, OHIO, U. S. A.

"No Profits Most Who Serves Best"

Better Steel Castings

THE J. E. BAKER COMPANY

Producers

DEAD BURNED DOLOMITE

LOW SILICA LIMESTONE

CHEMICAL AND FLUXING LIME

YORK, PA.

American

PLATED METAL

FOR WAR PRODUCTION • FOR POST-WAR PLANS

American Nickeloid Company

Peru, Illinois

ZINC - CHROMIUM NICKEL - BRASS COPPER FINISHES ... SHEETS AND COILS

BROOKE

PIG IRON

E. & G. BROOKE IRON CO.

BIRDSBORO, PENNA.

MFGRS OF HIGH GRADE

FOUNDRY

BASIC

GREY FORGE

MALLEABLE

BESSEMER

LOW PHOS.


# —USED and REBUILT EQUIPMENT—


WANTED

QUICK BUYER FOR

# 9 X 84" SHELL WHITING MODERN CUPOLA — CAPACITY 12 TONS PER HOUR. ALSO A 3300 LB. CAPACITY TEAPOT SPOUT STATIONARY MIXING LADLE. BOTH PRICED RIGHT FOR PROMPT ACTION.

ODIN STOVE MFG. CO.

ERIE, PA.

RAILS

AND ACCESSORIES

RELAYING RAILS — Super-quality machine-reconditioned—not ordinary Relayers.

NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Frogs, Switches, Tie Plates, and all other Track Accessories.

Although our tonnages are not as large as heretofore, most sizes are usually available from warehouse stocks.

Every effort made to take care of emergency requirements. *Phone, Write or Wire . . .*

L. B. FOSTER COMPANY, Inc.

PITTSBURGH NEW YORK CHICAGO

FOR SALE

1—Used No. 50 Perkins Stamping Press—20 Ton capacity, 3" stroke, complete with motor and individual drive.....$250.00

1—Used 18" Reed-Prentice Turret Lathe, 1-5/8" capacity with 9" swing over ways, geared head, equipped with new motor and "V" Belt Drive. Original Cost was $3745.00. Now on sale for $3250.00

1—Reconditioned, used 8" Sundstrand Stub Lathe, Model H-900, 40 to 265 R.P.M., less motor and tailstock.....$500.00

1—Used Landis Internal Grinder, 50" x 72" floor space, fixed ways, 36" wide cross slide table, 18" clearance from ways to center line of spindle, equipped with 15" spindle, less motor..$550.00

1—New not used 50 lb. Bradley Hammer with dies, Serial No. 657.....$1000.00

1—Used No. 5 American Gas Forge Furnace, 20" x 12" x 8" I.D., 34" x 24" Floor space, 50" high.....$100.00

2—Not used, 18" Type L Ventilating Fans, square plate mounting, direct 1720. Each fan complete with 1/2 H.P., 1720 R.P.M., 440V 60 cycle Explosion Proof Totally enclosed Ball Bearing Motor.....Priced at $61.00 each.

AGERSTRAND CORPORATION

Muskegon, Mich.

BORING MILL, 60" N-B-P, R.P.T., M.D.
BORING MILL, 84" N-B-P, R.P.T., M.D.
GEAR PLANERS, Bevel 36" & 54" Gleason, M.D.
HAMMER; Steam Forging 1100 lb. N-B-P.
HAMMER; Steam Forging 2000 lb. Morgan.
LATHE, 36" x 20' Geared Head American, M.D.
SHEARS, Plate 44" & 54" x 3/16" M.D.
STRAIGHTENER, 12-roll Kane & Roach, 1-1/4".
STRAIGHTENER, Wire Shuster, cap. 5/8".
STRAIGHTENER, 12-roll H. & J., 84" x 1/2", M.D.

LANG MACHINERY COMPANY

28th Street & A. V. R. R. Pittsburgh, Pa.

RAIL-ACCESSORIES

RAILWAY EQUIPMENT

• BOUGHT • SOLD •

WRITE—WIRE—PHONE

DULIEN STEEL PRODUCTS, INC.

414 First Ave., So. Seattle, Wash. — 2280 Woolworth Bldg. New York, N. Y.

FOR SALE

STEEL BUILDINGS

AND TANKS

PIPE AND BOILER TUBES

JOS. GREENSPON'S SON PIPE CORP.

National Stock Yds., Illinois

SELLERS—BUYERS—TRADERS

More for Your Dollar! • IRON & STEEL PRODUCTS INC. • 38 Years' Experience

13462 S. Brainard Ave. Chicago, Illinois

"Anything containing IRON or STEEL"

BUY — SELL — RENT

CARS, LOCOMOTIVES, CRANES

STEEL SHEET PILING, PILE HAMMERS

HOISTS, DERRICKS, TANKS, COMPRESSORS

BOILERS, TURBINES, DIESEL ENGINES, ETC.

MISSISSIPPI VALLEY EQUIPMENT CO.

503 Locust St. St. Louis, Mo.

ROLLING MILLS and EQUIPMENT

FRANK B. FOSTER

829 OLIVER BUILDING PITTSBURGH PA

Cable Address "FOSTER" Pittsburgh

# USED and REBUILT EQUIPMENT

**SPECIAL ATTENTION!**

STEEL MILLS,
BLAST FURNACES AND FOUNDRIES!
*For Sale:*

**ALLOY ("CRITICAL") SCRAP**

TURNINGS: $9.00 G.T. Houston plus payable OPA Nickel or Moly. Premiums.
15 C/L SAE 3100; WPB No. 6
12 C/L Moly.-Mn.; WPB No. 7

TURNINGS: $12.91 G.T. Tracks, Chicago, plus payable OPA Nickel Premium.
15 C/L 1.00-3.75% Nickel; WPB No. 6

FLASHINGS & CROPS: $16.50 G.T. Houston plus payable OPA Nickel or Moly. Premiums.
6 C/L SAE 3100; WPB No. 6
3 C/L SAE 4800; WPB No. 6
6 C/L Moly.-Mn.; WPB No. 7

NOTE: Relative quantities of Turnings must be purchased with Flashings and Crops.

**IRON & STEEL PRODUCTS, INC.**
13462 S. Brainard Ave., Chicago, Illinois
*"ANYTHING containing IRON or STEEL"*

**—REBUILT—**
BLOWERS - FANS - EXHAUSTERS

Connersville-Roots positive blowers. Centrifugals for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans and roof ventilators.

**GENERAL BLOWER CO.**
424 North Peoria St. Chicago, Ill.

**WANTED**

The following new or second-hand motor-driven machines:

One set curving rolls for 2.66" corrugated culvert pipe.

One steel power brake 4' to 10', capacity Z bend No. 8 Ga., 1½" aprons. State price, place of inspection, condition.

Box 896,
STEEL, Penton Bldg., Cleveland

**POLISHING MACHINE**

1—Acme 3-wheel automatic polishing machine for tubes or pipe up to 3" O.D. Driven by 15 H.P. A.C. motor with necessary starting equipment.

**WELLMAN BRONZE & ALUMINUM CO.**
2525 East 93rd St. Cleveland, Ohio

**RELAYING RAIL**

Practically all weights—Any quantity. Immediate shipment, strictly first quality reconditioned Relaying Rail and Accessories.
*Write, Wire, or Phone*
**MIDWEST STEEL CORPORATION**
Charleston, W. Va.

**FOR SALE**

ONE MODERN LECTROMELT SIZE "U" ELECTRIC FURNACE. 500 LB. BATCH CAPACITY. 13,200 VOLT PRIMARY, WITH 10 SECONDARY VOLTAGES, PRACTICALLY NEW WITH COMPLETE EQUIPMENT.

**AMERICAN CAST IRON PIPE CO.**
BIRMINGHAM, ALABAMA

**FOR SALE**

USED PIPE, FITTINGS, VALVES, STEEL RODS, STEEL BUILDINGS, INDUSTRIAL EQUIPMENT.

**INDUSTRIAL SUPPLY & EQUIPMENT CO., INC.**
1044 Canal Bldg., New Orleans, La.

OFFER APPROXIMATELY A CARLOAD OF SHERADIZED SEAMLESS TUBING RANGING IN SIZES FROM 1¼ INCHES TO 3½ INCHES. WRITE FOR PRICES AND QUANTITY DESIRED.

Address Box 831
STEEL, Penton Bldg., Cleveland

# CLASSIFIED

## Help Wanted

**WANTED**

**MECHANICAL ENGINEER**
for Forge Plant and Machine Shop

•

**ASSISTANT WORKS MANAGER**
for Forge Plant

•

**FOREMEN**
for Forge Plant

•

Must have thorough experience in forge plant operations. These are permanent positions with good salaries and excellent futures for capable men. Give full details of experience, education and personal data. Address:

Personnel Director
**TUBE TURNS**
INCORPORATED
224 E. Broadway
LOUISVILLE, KY.

## Help Wanted

**HEAT TREATING FURNACE DESIGNER**

Permanent position for experienced engineer with long-established and progressive Eastern manufacturer of heat treating furnaces. Applicant must have had at least ten years of designing experience on heat treating furnaces, be thoroughly familiar with standard furnace construction and capable of advanced designing for future operations.

Very substantial salary with unlimited peace-time possibilities.

For an interview at our expense, kindly furnish detailed experience and qualifications in writing.

Address Box 897, STEEL, Penton Bldg., Cleveland.

**WANTED: MAN WITH GENERAL OFFICE** or field sales experience by large reputable manufacturer of seamless and electric welded tubing, alloy and carbon steels. Please apply giving full information, experience, etc., to Box 894, STEEL, Penton Bldg., Cleveland.

**IN NEED OF QUALIFIED NIGHT SUPERINTENDENT** in welded sheet and steel plate fabricating shop. Good salary and future for right person. Reply Box 886, STEEL, Penton Bldg., Cleveland.

## Help Wanted

**WANTED**

**Mechanical Engineer**

Well established Midwest Pump Manufacturer offers position of Chief Engineer to man experienced in the Design of Reciprocating and Centrifugal Pumps. This position is permanent and offers an experienced man the opportunity to become part of the management in a well financed company, which is now on war work. Please answer giving complete experience, draft status, personal history, etc. All replies will be held confidential. Address Box 901, STEEL, Penton Bldg., Cleveland.

## Positions Wanted

**DISTRIBUTORS WANTED**

A few territories are available for alert, aggressive distributors to handle a top-notch line of refractory specialties. Our distributors are backed with ample "dealer helps", trade journal advertising, and products of proven merit. In writing state experience in marketing refractories and territory wanted. Address Box 900, STEEL, Penton Bldg., Cleveland.

**FOUNDRY SUPERINTENDENT — 25 YEARS** experience in Malleable Iron Foundry. Operated Duplex Melting as well as Batch Melting Furnaces. Metallurgical training. Reply Box 895, STEEL, Penton Bldg., Cleveland.

## Employment Service

**SALARIED POSITIONS—This advertising service of 33 years' recognized standing negotiates for high salaried supervisory, technical and executive positions. Procedure will be individualized to your personal requirements and will not conflict with Manpower Commission. Retaining fee protected by refund provision. Send for details. R. W. BIXBY, Inc., 110 Delward Bldg., Buffalo, N. Y.**

# CLASSIFIED

Opportunities | Opportunities | Opportunities

## Malleable Iron Foundry For Sale

Located in Midwest, with a long record of full and successful operation.

Capacity four thousand to six thousand tons per annum.

Well established list of customers of long time standing whose normal peacetime demand will assure a good level of operations at the plant.

Present backlog of orders is substantial, and production is over ninety percent on ratings of AA-2-X or better.

Plant has always been well maintained and has a present value far in excess of price asked.

Inquiries are invited.

Doremus & Company
*Advertising Agency*
208 South La Salle Street • CHICAGO

# CONTRACT WORK

**SHEET STEEL FABRICATORS**

Welded or Riveted Construction. Can handle No. 10 gauge and lighter. Send us your inquiries for estimates.

THE HAINES COMPANY
1931 W. Lake St. Chicago, Ill.

Send your inquiries for
**SPECIAL ENGINEERING WORK**
to the
**A. H. NILSON MACHINE COMPANY, BRIDGEPORT, CONN.**
designers and builders of wire and ribbon stock forming machines.
*We also solicit your bids for cam milling*

**KIRK & BLUM**
WELDED MACHINE BASES, PEDESTALS and FRAMES
LATHE PANS
GEAR and BELT GUARDS
*Pressed Steel Louver Panels and Cover Plates*
THE KIRK & BLUM MFG. CO.
2822 Spring Grove Ave. Cincinnati, Ohio

**HOT DIP GALVANIZING**
*"A Material Difference"*
GALVANIZED PRODUCTS
PRODUCTION HEAT TREATING
COMMERCIAL METALS TREATING INC.
TOLEDO, OHIO

## Castings

**KING FOUNDRIES, INC., NORTH WALES, Pa.** Grey Iron and Semi Steel Castings, also alloyed with Nickel, Chrome, and Molybdenum. Wood, Iron, Brass, and Aluminum Pattern work.

WE HAVE A LARGE
**GALLAND-HENNING HYDRAULIC BALING MACHINE MODEL 125 TC**
(FOR BALING STEEL SCRAP)
which we would consider LEASING to a Manufacturing Plant or a responsible Scrap Dealer. This machine is of the largest type made, capacity eight tons an hour. Delivery and installation can be made immediately. Inquiries should give full particulars on material for bailing, quantities, etc. Address Box 898, STEEL, Penton Bldg., Cleveland.

# BE WISE—PROLONG THE LIFE OF CONVEYOR BELTS AND BELT CONVEYOR EQUIPMENT!

If "we" could only talk—here's what we'd say: "Operators, please give us extra special care to make us last longer. This is mighty important during wartime, because materials used in belt conveyor equipment are needed for guns, tanks, planes and other war equipment. Be wise—be patriotic—follow this advice—it will pay extra dividends in trouble-free operation."

1

**KEEP INSTALLATION CLEAN.** Cleanliness plays an important part in prolonging the life of your belt conveyor equipment. Make a daily inspection to see that there is no accumulation of material that has spilled off the belt. If material is not removed it will cause the belt to drag over it as well as around the head, tail, snub and other pulleys. Consideration should also be given to cleaning the belt. The material being handled determines the type of cleaning device.

2

**TRAIN THE BELT AND MAINTAIN THE TRAINING WITH SELF-ALIGNING IDLERS.** It is important that both the carrying and return runs of a conveyor belt be kept practically central with its supporting idlers. This can be accomplished by properly "training" the belt on the conveyor . . maintaining that training is assured through the use of self-aligning idlers and return rolls. Link-Belt manufactures a complete line of self-aligning idlers to meet every need.

3

**USE IMPACT IDLERS AT LOADING AND TRANSFER POINTS.** When tons of ore, rock, coal and other materials slap a belt on the back, proper protection must be given at the loading point. The use of Link-Belt Rubber-Tread Impact Idlers definitely prolongs belt life by preventing cutting and bruising of belt . . cushioning even the heaviest blows . . thus greatly increasing belt life and protecting the belt, idler bearings and framework. Link-Belt engineers will be glad to make recommendations.

4

**MAINTAIN PROPER BELT TENSION AND LUBRICATION.** Eliminate excessive belt sag between idler rolls—Proper tension relieves the belt of much unnecessary wear . . Never over-lubricate idler rolls—inspection of one idler roll will often determine at what intervals equipment should be lubricated. Too much grease is as bad as too little.

**AND MAKE IT A RULE** to establish regular inspection periods—and make replacements with genuine Link-Belt parts when necessary. Link-Belt manufactures a complete line of idlers, pulleys, bearings, take-ups, drives, trippers, etc.

# LINK-BELT
## BELT CONVEYOR EQUIPMENT

**LINK-BELT COMPANY**

Indianapolis, Chicago, Philadelphia, Atlanta, Dallas, San Francisco, New York, Toronto, Cleveland, Pittsburgh, Detroit. Offices, warehouses and distributors in principal cities. 9087-C

# ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.


| | Page |
|---|---|
| **A** | |
| Abrasive Co. | * |
| Abrasive Products, Inc. | * |
| Accurate Spring Mfg. Co. | * |
| Ace Manufacturing Corp. | * |
| Acheson Colloids Corp. | * |
| Aetna-Standard Engineering Co., The | * |
| Ahlberg Bearing Co. | * |
| Air Reduction | * |
| Ajax Electrothermic Corp. | * |
| Ajax Flexible Coupling Co. | 128 |
| Alan Wood Steel Co. | * |
| Aldrich Pump Co., The | * |
| Allegheny Ludlum Steel Corp. | * |
| Allen-Bradley Co. | * |
| Alliance Machine Co. | * |
| Allis-Chalmers Mfg. Co. | 8, 9 |
| Alloy Metal Abrasive Co. | 151 |
| Alrose Chemical Co. | * |
| Aluminum Company of America | 34 |
| American Agile Corp. | * |
| American Air Filter Co., Inc. | * |
| American Brass Co. | * |
| American Bridge Co. | * |
| American Broach & Machine Co. | * |
| American Cable Division of American Chain & Cable Co., Inc. | 121 |
| American Chain & Cable Co., Inc., American Cable Division | 121 |
| American Chain & Cable Co., Inc., American Chain Division | * |
| American Chain & Cable Co., Inc., Page Steel & Wire Division | * |
| American Chain & Cable Co., Inc., Wright Manufacturing Div. | * |
| American Chain Division of American Chain & Cable Co., Inc. | * |
| American Chemical Paint Co. | * |
| American Foundry Equipment Co. | * |
| American Hot Dip Galvanizers Association | * |
| American Metal Hose Branch of the American Brass Co. | * |
| American MonoRail Co. | 59 |
| American Nickeloid Co. | 161 |
| American Pipe Bending Machine Co., Inc. | 153 |
| American Pulverizer Co. | * |
| American Roller Bearing Co. | * |
| American Rolling Mill Co., The | * |
| American Screw Co. | * |
| American Shear Knife Co. | 136 |
| American Steel & Wire Co. | * |
| American Zinc Sales Co. | 105 |
| Ampco Metal, Inc. | * |
| Amsler-Morton Co., The | * |
| Anaconda Wire & Cable Co. | 103 |
| Andrews Steel Co., The | 129 |
| Anker-Holth Mfg. Co. | * |
| Apex Machine & Tool Co., The | 17 |
| Arkansas Fuel Oil Co. | * |
| Armstrong-Blum Mfg. Co. | 154 |
| Atkins, E. C., & Co. | * |
| Atlas Car & Mfg. Co. | 160 |
| Atlas Drop Forge Co. | * |
| Atlas Lumnite Cement Co. | * |
| **B** | |
| Babcock & Wilcox Co., Refractories Div. | * |
| Babcock & Wilcox Tube Co. | * |
| Bailey, Wm. M., Co. | * |
| Baker Brothers, Inc. | * |
| Baker, J. E., Co. | 161 |
| Baker-Raulang Co. | * |
| Baldwin-Southwark Division, The Baldwin Locomotive Works | * |
| Bantam Bearings Corp. | 108 |
| Barium Stainless Steel Corp. | 159 |
| Barnes, Wallace, Co., Division of Associated Spring Corporation | * |
| Basic Refractories, Inc. | * |
| Bayard, M. L., & Co. | * |
| Bay City Forge Co. | * |
| Bay State Abrasive Products Co. | * |
| Beall Tool Co. | 153 |
| Beatty Machine & Mfg. Co. | 148 |
| Belmont Iron Works | 159 |
| Berger Manufacturing Div., Republic Steel Corp. | 29 |
| Bethlehem Steel Co. | 1 |
| Birdsboro Steel Foundry & Machine Co. | 12 |
| Bissett Steel Co., The | * |
| Bixby, R. W., Inc. | 162 |
| Blanchard Machine Co. | * |
| Blaw-Knox Co. | * |
| Blaw-Knox Division, Blaw-Knox Co. | * |
| Bliss & Laughlin, Inc. | * |
| Blodgett, G. S., Co., Inc. | * |
| Bloom Engineering Co. | * |
| Bridgeport Brass Co. | * |
| Bristol Brass Corp., The | * |
| Bristol Co., The | * |
| Brooke, E. & G., Iron Co. | 161 |
| Brosius, Edgar E., Co. | * |
| Brown & Sharpe Mfg. Co. | * |
| Brown Instrument Co., The | * |
| Brush Development Co., The | * |
| Bryant Chucking Grinder Co. | * |
| Bryant Machinery & Engineering Co. | * |
| Buda Co., The | * |
| Buffalo Forge Co. | * |
| Bullard Co., The | 117 |
| Bundy Tubing Co. | * |
| **C** | |
| Cadman, A. W., Mfg. Co. | * |
| Carboloy Co., Inc. | 91 |
| Carborundum Co., The | * |
| Cardox Corp. | * |
| Carey, Philip, Mfg. Co., The | * |
| Carnegie-Illinois Steel Corp. | * |
| Carpenter Steel Co., The | * |
| Cattie, Joseph P., & Bros., Inc. | * |
| Cellcote Co., The | * |
| Central Screw Co. | 137 |
| Century Electric Co. | 93 |
| Chambersburg Engineering Co. | * |
| Champion Rivet Co., The | * |
| Chandler Products Corp. | * |
| Chase Foundry & Mfg. Co. | 132 |
| Chicago Metal Hose Corp. | * |
| Chicago Perforating Co. | 155 |
| Chicago Rawhide Mfg. Co. | * |
| Chicago Tramrail Co. | * |
| Chicago Wheel & Mfg. Co. | * |
| Cincinnati Grinders, Inc. | * |
| Cincinnati Milling Machine Co. | * |
| Cincinnati Shaper Co., The | * |
| Cities Service Oil Co. | * |
| Clark Tructractor Div. of Clark Equipment Co. | * |
| Cleereman Machine Tool Co. | * |
| Cleveland Automatic Machine Co. | * |
| Cleveland Cap Screw Co. | * |
| Cleveland-Cliffs Iron Co. | * |
| Cleveland Crane & Engineering Co. | 35 |
| Cleveland Hotel | * |
| Cleveland Pneumatic Tool Co., The | * |
| Cleveland Punch & Shear Works Co. | * |
| Cleveland Tool Engineering Co. | 150 |
| Cleveland Tramrail Division, Cleveland Crane & Engineering Co. | * |
| Cleveland Twist Drill Co., The | * |
| Cleveland Worm & Gear Co., The | * |
| Climax Molybdenum Co. | 64 |
| Cold Metal Products Co. | * |
| Colonial Broach Co. | * |
| Columbia Steel Co. | 22, 23 |
| Columbus Die, Tool & Machine Co. | 157 |
| Commercial Metals Treating, Inc. | 163 |
| Cone Automatic Machine Co., Inc. | * |
| Consolidated Machine Tool Corp. | * |
| Continental Machines, Inc. | * |
| Continental Roll & Steel Foundry Co. | 107 |
| Continental Screw Co. | * |
| Continental Steel Corp. | * |
| Cooper-Bessemer Corp. | * |
| Copperweld Steel Co. | * |
| Corbin Screw Corp. | * |
| Cowles Tool Co. | 153 |
| Crane Co. | * |
| Cross Gear & Machine Co. | 20 |
| Cuban-American Manganese Corp. | * |
| Cullen-Friestedt Co. | * |
| Culvert Division, Republic Steel Corp. | 29 |
| Cunningham, M. E., Co. | * |
| Curtis Pneumatic Machinery Division of Curtis Manufacturing Co. | * |
| Cutler-Hammer, Inc. | * |
| **D** | |
| Darwin & Milner, Inc. | 159 |
| Davenport Besler Corp. | * |
| Davis & Thomason Co. | * |
| Davis Brake Beam Co. | * |
| Denison Engineering Co., The | 5 |
| DeSanno, A. P., & Son, Inc. | * |
| Detroit Electric Furnace Division, Kuhlman Electric Co. | * |
| Detroit-Leland Hotel | * |
| Detroit Rex Products Co. | * |
| Detroit Tap & Tool Co. | * |
| DeWitt Operated Hotels | 149 |
| Diamond Tool Co. | * |
| Diebold Safe & Lock Co. | * |
| Dietert, Harry W., Co. | 155 |
| Disston, Henry, & Sons, Inc. | * |
| Dodge Manufacturing Corp. | * |
| Dow Chemical Co., The | 100 |
| Downs Crane & Hoist Co. | * |
| Doyle, J. E., Co., The | * |
| Drave Corp., Engineering Works Div. | * |
| Drave Corp., Machinery Div. | * |
| Dulien Steel Products, Inc. | 161 |
| **E** | |
| Easton Car & Construction Co. | * |
| Edison, Thomas A., Inc. | * |
| Egyptian Lacquer Mfg. Co., The | * |
| Elastic Stop Nut Corp. | * |
| Electric Controller & Mfg. Co. | * |
| Electric Furnace Co., The | * |
| Electric Storage Battery Co. | 115 |
| Electro Metallurgical Co. | * |
| Electroweld Steel Corp. | * |
| Elliott Manufacturing Co., The | 136 |
| Enterprise Galvanizing Co. | * |
| Erdle Perforating Co., The | * |
| Erie Bolt & Nut Co. | 130 |
| Erie Foundry Co. | 27 |
| Etna Machine Co. | * |
| Eureka Fire Brick Works | * |
| Eutectic Welding Alloys Co. | * |
| Ex-Cell-O Corp. | * |
| **F** | |
| Fafnir Bearing Co., The | * |
| Fairbanks, Morse & Co. | * |
| Fairfield Mfg. Co. | * |
| Farquhar, A. B., Co., Ltd. | * |
| Farval Corp., The | Inside Back Cover |
| Ferracute Machine Co. | * |
| Fidelity Machine Co. | * |
| Firth-Sterling Steel Co. | * |
| Fitchburg Grinding Machine Corp. | * |
| Fitzsimons Co., The | * |
| Flori Pipe Co., The | * |
| Foote Bros. Gear & Machine Corp. | 10 |
| Foster, Frank B. | 161 |
| Foster, L. B., Co., Inc. | 161 |
| Foxboro Co., The | * |
| Frasse, Peter A., & Co., Inc. | * |
| Fuller Brush Co. | * |
| **G** | |
| Galland-Henning Mfg. Co. | * |
| Garrett, Geo. K., Co. | * |
| General Blower Co. | 162 |
| General Electric Co. | 30, 31 |
| General Excavator Co. | * |
| General Steel Warehouse Co., Inc. | * |
| Genesee Tool Co. | * |
| Gisholt Machine Co. | * |
| Globe Brick Co., The | * |
| Granite City Steel Co. | * |
| Grant Gear Works | * |
| Graver Tank & Mfg. Co., Inc. | * |
| Graybar Electric Co. | 44 |
| Great Lakes Steel Corp. | 11 |
| Greenfield Tap & Die Corp. | 24 |
| Greenlee Brothers & Co. | * |
| Greenspon's, Jos., Son Pipe Corp. | 161 |
| Grinnell Co., Inc. | * |
| Gruendler Crusher & Pulverizer Co. | 157 |
| Gulf Oil Corp. | * |
| Gulf Refining Co. | * |
| **H** | |
| Hagan, George J., Co. | * |
| Halliden Machine Co., The | * |
| Hanlon-Gregory Galvanizing Co. | * |
| Hanna Furnace Corp. | * |
| Hannifin Mfg. Co. | * |
| Hansen Mfg. Co. | * |
| Harbison-Walker Refractories Co. | * |
| Harnischfeger Corp. | * |
| Harper, H. M., Co., The | * |
| Harrington & King Perforating Co. | 155 |
| Hassal, John, Inc. | * |
| Hays Corp., The | * |
| Heald Machine Co. | Inside Front Cover |
| Helmer-Staley, Inc. | * |
| Hendrick Manufacturing Co. | 155 |
| Heppenstall Co. | 33 |
| Hercules Co., The | * |
| Hevi-Duty Electric Co. | * |
| Hill Acme Co., The | * |
| Hills-McCanna Co. | * |
| Hindley Mfg. Co. | * |
| Hobart Bros. Co. | 157 |
| Homestead Valve Mfg. Co. | * |
| Horsburgh & Scott Co. | * |
| Houghton, E. F., & Co. | * |
| Howard Foundry Co. | * |
| Hubbard, M. D., Spring Co. | 153 |
| Hughes-Keenan Co., The | * |
| Hyatt Bearings Division, General Motors Corporation | * |
| Hyde Park Foundry & Machine Co. | * |
| Hydraulic Machinery, Inc. | * |
| Hydraulic Press Mfg. Co., The | 67 |
| Hydro-Arc Furnace Corp. | * |
| Hydropress, Inc. | * |
| **I** | |
| Illinois Clay Products Co. | * |
| Illinois Tool Works | * |
| Independent Engineering Co. | * |
| Industrial Brownhoist Corp. | * |
| Ingersoll Steel & Disc Division, Borg-Warner Corp. | * |
| Inland Steel Co. | 47 |
| International Nickel Co., Inc. | * |
| International Screw Co. | * |
| Iron & Steel Products, Inc. | 161, 162 |
| **J** | |
| Jackson Iron & Steel Co., The | * |
| James, D. O., Mfg. Co. | 149 |
| Jeffrey Manufacturing Co., The | * |
| Jessop Steel Co. | * |
| Jessop, Wm., & Sons, Inc. | 159 |
| Johns-Manville Corp. | * |
| Johnson Bronze Co. | * |
| Johnson Gas Appliance Co. | 135 |
| Johnson Steel & Wire Co., Inc. | * |
| Jones & Lamson Machine Co. | * |
| Jones & Laughlin Steel Corp. | * |
| Jones, W. A., Foundry & Machine Co. | * |
| **K** | |
| Kardong Brothers, Inc. | * |
| Kaydon Engineering Corp., The | * |
| Kearney & Trecker Corp. | 138 |
| Kemp, C. M., Mfg. Co. | * |
| Kester Solder Co. | * |
| Keystone Steel & Wire Co. | * |
| Kidde, Walter, & Co., Inc. | 97 |
| King Fifth Wheel Co. | * |


(Continued on next page)

# ADVERTISING INDEX

*Advertisements appear in previous issues.

Where-To-Buy Products Index carried quarterly.


(Continued from preceding page)

| | Page |
|---|---|
| King Foundries, Inc. | 163 |
| Kinnear Mfg. Co. | * |
| Kirk & Blum Mfg. Co. | 163 |
| Kold-Hold Manufacturing Co. | * |
| Koppers Co. | * |
| Kropp Forge Co. | * |

L

| | |
|---|---|
| Ladish Drop Forge Co. | * |
| Lake City Malleable Co. | * |
| Lakeside Steel Improvement Co., The | * |
| Laminated Shim Co. | * |
| Lamson & Sessions Co., The | * |
| Lamson Corp. | * |
| Landis Machine Co. | * |
| Lang Machinery Co. | 161 |
| Latrobe Electric Steel Co. | * |
| Layne & Bowler, Inc. | * |
| Lebanon Steel Foundry | * |
| LeBlond, R. K., Machine Tool Co., The | * |
| Leeds & Northrup Co. | * |
| Lee Spring Co., Inc. | * |
| Lepel High Frequency Laboratories, Inc. | * |
| Leschen, A., & Sons Rope Co. | 151 |
| Levinson Steel Co., The | * |
| Levinson Steel Sales Co. | * |
| Lewis Foundry & Machine Division of Blaw-Knox Co. | * |
| Lewis Machine Co., The | * |
| Lincoln Electric Co., The | * |
| Linde Air Products Co., The | * |
| Link-Belt Co. | 164 |
| Logemann Bros. Co. | * |
| Lovejoy Flexible Coupling Co. | 157 |
| Luers, J. Milton | * |

Mc

| | |
|---|---|
| McKay Co., The | * |
| McKay Machine Co. | * |
| McKee, Arthur G., Co. | * |
| McKenna Metals Co. | 123 |
| McKinney Manufacturing Co. | 21 |

M

| | |
|---|---|
| MacDermid, Inc. | * |
| Mackintosh-Hemphill Co. | * |
| Macklin Co. | * |
| Macwhyte Co. | * |
| Magnaflux Corp. | * |
| Magnus Chemical Co. | * |
| Mahon, R. C., Co., The | * |
| Mahr Manufacturing Co. | * |
| Mallory, P. R., & Co., Inc. | 41 |
| Manheim Manufacturing & Belting Co. | * |
| Manning, Maxwell & Moore, Inc. | * |
| Markal Co. | * |
| Master Electric Co., The | * |
| Mathews Conveyer Co. | * |
| Matthews, Jas. H., & Co. | * |
| Mattison Machine Works | * |
| Medart Co., The | * |
| Meehanite Research Institute | 18 |
| Mercury Mfg. Co. | * |
| Mesta Machine Co. | * |
| Metal & Thermit Corporation | 111 |
| Michiana Products Corp. | * |
| Michigan Tool Co. | * |
| Micromatic Hone Corp. | * |
| Midvale Co., The | * |
| Midwest Steel Corp. | 162 |
| Milton Mfg. Co., The | 157 |
| Milwaukee Metal Spinning Co. | * |
| Minnesota Mining & Mfg. Co. | * |
| Mississippi Valley Equipment Co. | 161 |
| Molybdenum Corporation of America | * |
| Monarch Machine Tool Co., The | 42 |
| Monarch Steel Co. | * |
| Morgan Construction Co. | * |
| Morgan Engineering Co. | * |
| Morrison Engineering Corp. | * |
| Morton Salt Co. | * |
| Motch & Merryweather Machinery Co. | 155 |
| Motor Products Corp. | * |
| Munning & Munning, Inc. | * |

N

| | |
|---|---|
| National Acme Co. | * |
| National Bearing Metals Corp. | 37 |
| National Bronze & Aluminum Foundry Co. | * |
| National Carbon Co., Inc., Carbon Sales Division | 95 |
| National Fireproofing Corp. | 161 |
| National Lead Co. | * |
| National Lock Washer Co. | * |
| National Machinery Co., The | 6, 7 |
| National Roll & Foundry Co. | * |
| National Screw & Mfg. Co. | * |
| National Steel Corp. | 11 |
| National Tube Co. | 22, 23 |
| New Departure Division General Motors Corp. | * |
| New England Screw Co. | * |
| New Jersey Zinc Co. | * |
| Newport Rolling Mill Co., The | 129 |
| New York & New Jersey Lubricant Co. | * |
| Niagara Machine & Tool Works | * |
| Niles Steel Products Div., Republic Steel Corp. | 29 |
| Nilson, A. H., Machine Co. | 163 |
| Nitralloy Corp., The | * |
| Norma-Hoffmann Bearings Corp. | * |
| Northwest Engineering Co. | * |
| Norton Co., The | * |

O

| | |
|---|---|
| Oakite Products, Inc. | * |
| Ohio Crankshaft Co. | * |
| Ohio Electric Mfg. Co. | 155 |
| Ohio Galvanizing & Mfg. Co. | 157 |
| Ohio Knife Co., The | * |
| Ohio Locomotive Crane Co., The | 157 |
| Ohio Seamless Tube Co., The | * |
| Ohio Steel Foundry Co., The | * |
| Oliver Iron & Steel Corp. | * |
| O'Neil-Irwin Mfg. Co. | * |
| Osgood Co., The | * |
| Oster Mfg. Co., The | * |

P

| | |
|---|---|
| Page Steel & Wire Division American Chain & Cable Co., Inc. | * |
| Pangborn Corp. | * |
| Park Chemical Co. | * |
| Parker, Charles, Co. | * |
| Parker-Kalon Corp. | * |
| Pawtucket Screw Co. | * |
| Pennsylvania Flexible Metallic Tubing Co. | * |
| Pennsylvania Industrial Engineers | * |
| Pennsylvania Salt Mfg. Co. | * |
| Penola Lubricants | * |
| Perkins, B. F., & Son, Inc. | 158 |
| Pheoll Mfg. Co. | * |
| Philadelphia Gear Works | * |
| Philadelphian Hotel | * |
| Phillips Screw Manufacturers | * |
| Phoenix Mfg. Co. | * |
| Pittsburgh Crushed Steel Co. | * |
| Pittsburgh Gear & Machine Co. | * |
| Pittsburgh Lectromelt Furnace Corp. | * |
| Pittsburgh Rolls Division of Blaw-Knox Co. | * |
| Plymouth Locomotive Works Division of The Fate-Root-Heath Co. | * |
| Poole Foundry & Machine Co. | * |
| Porter, H. K., Co., Inc. | * |
| Pressed Steel Car Co., Inc. | * |
| Pressed Steel Tank Co. | * |
| Progressive Welder Co. | * |
| Protected Steel Products Co. | * |
| Purdy, A. R., Co., Inc. | * |

R

| | |
|---|---|
| Racine Tool & Machine Co. | * |
| Ransohoff, N., Inc. | * |
| Ransome Machinery Co. | * |
| Raymond Mfg. Co., Division of Associated Spring Corp. | * |
| Reading Chain & Block Corp. | * |
| Reading Screw Co. | * |
| Ready-Power Co. | * |
| Reeves Steel & Manufacturing Co. | * |
| Reliance Electric & Engineering Co. | * |
| Republic Steel Corp. | 29 |
| Revere Copper & Brass, Inc. | 89 |
| Rhoades, R. W., Metaline Co., Inc. | * |
| Richards, Arklay S., Co., Inc. | * |
| Roebling's, John A., Sons Co. | * |
| Rollway Bearing Co., Inc. | * |
| Roosevelt Hotel | * |
| Roper, George D., Corp. | 125 |
| Ross Heater & Mfg. Co., Inc. | 146 |
| Ross Operating Valve Co. | * |
| R-S Products Corporation | * |
| Ruemelin Mfg. Co. | * |
| Russell, Burdsall & Ward Bolt & Nut Co. | * |
| Ryerson, Joseph T., & Son, Inc. | 159 |

S

| | |
|---|---|
| Saginaw Malleable Iron Div. General Motors Corp. | * |
| St. Joseph Lead Co. | 26 |
| St. Louis Button Co. | 151 |
| Salem Engineering Co. | 16 |
| Samuel, Frank, & Co., Inc. | * |
| Sandvik Steel, Inc. | * |
| Savage Tool Co. | * |
| Scaife Co. | * |
| Scherr, George, Co. | * |
| Schultz, Ferdinand G., Co. | 28 |
| Scovill Mfg. Co. | * |
| Sellers, Wm., & Co., Inc. | * |
| Seneca Wire & Mfg. Co., The | 159 |
| Seymour Mfg. Co., The | * |
| Shakeproof, Inc. | * |
| Sheffield Corp., The | * |
| Shell Oil Co., Inc. | * |
| Shenango Furnace Co., The | 149 |
| Shenango-Penn Mold Co. | * |
| Shepard Niles Crane & Hoist Corp. | * |
| Shuster, F. B., Co., The | * |
| Silent Hoist Winch & Crane Co. | * |
| Simonds Gear & Mfg. Co. | 155 |
| Simonds Saw & Steel Co. | * |
| Sinclair Refining Co. | 118 |
| SKF Industries, Inc. | * |
| Smith, David, Steel Co., Inc. | 159 |
| Smith Oil & Refining Co. | * |
| Smith Tool & Engineering Co. | * |
| Snyder, W. P., & Co., Inc. | 149 |
| Socony Vacuum Oil Co., Inc. | 71 |
| South Bend Lathe Works | 99 |
| Southington Hardware Mfg. Co. | * |
| Spriesch Tool & Manufacturing Co. | * |
| Standard Steel Works | * |
| Standard Tube Co., The | * |
| Stanley Works, The | * |
| Steel & Tubes Division, Republic Steel Corp. | 29 |
| Steel Founders' Society of America | * |
| Steelweld Machinery Division, Cleveland Crane & Engineering Co. | 35 |
| Sterling Grinding Wheel Div. of the Cleveland Quarries Co. | 147 |
| Strom Steel Ball Co. | * |
| Strong Steel Foundry Co. | * |
| Struthers Wells Corp. | * |
| Sturtevant, B. F., Co. | * |
| Sturtevant, P. A., Co. | * |
| Sun Oil Co. | * |
| Superior Steel Corp. | * |
| Surface Combustion Corp. | * |
| Swindell-Dressler Corp. | * |
| Syntron Co. | * |

T

| | |
|---|---|
| Taylor-Wilson Mfg. Co. | 127 |
| Tennessee Coal, Iron & Railroad Co. | * |
| Texas Co., The | * |
| Thomas Flexible Coupling Co. | * |
| Thomas Machine Mfg. Co. | * |
| Thomas Steel Co., The | 126 |
| Tide Water Associated Oil Co. | 14, 15 |
| Timken Roller Bearing Co. | Back Cover |
| Timken Steel & Tube Division, The Timken Roller Bearing Co. | * |
| Tinnermann Products, Inc. | 69 |
| Titanium Alloy Manufacturing Co. | * |
| Toledo Scale Co. | * |
| Toledo Stamping & Mfg. Co. | * |
| Tomkins-Johnson Co., The | * |
| Torrington Co., The | * |
| Towmotor Co. | * |
| Traban Engineering Corp. | * |
| Trico Products Corp. | * |
| Triplex Screw Co., The | * |
| Truscon Steel Co. | 29 |
| Tubular Alloy Steel Corp. | * |
| Turco Products Inc. | * |
| Turner Gauge Grinding Co. | 131 |

U

| | |
|---|---|
| Udylite Corp., The | * |
| Union Carbide & Carbon Corp. | 95 |
| Union Drawn Steel Div., Republic Steel Corp. | 29 |
| United Chromium, Inc. | 19 |
| United Engineering & Foundry Co. | 2, 3 |
| United States Graphite Co. | 152 |
| United States Rubber Co. | * |
| United States Steel Corp., Subsidiaries | 13, 22, 23 |
| United States Steel Export Co. | 22, 23 |
| United States Steel Supply Co. | 13 |

V

| | |
|---|---|
| Valley Mould & Iron Corp. | Front Cover |
| Vanadium Alloys Steel Co. | * |
| Vanadium Corporation of America | * |
| Vaughn Machinery Co., The | * |
| Veeder-Root, Inc. | * |
| Vickers, Inc. | * |

W

| | |
|---|---|
| Waldron, John, Corp. | * |
| Walker-Turner Co., Inc. | * |
| Ward Leonard Electric Co. | * |
| Warner & Swasey Co. | * |
| Washburn Wire Co. | * |
| Watson-Stillman Co., The | * |
| Wean Engineering Co., The | * |
| Weatherhead Co., The | * |
| Webb Corporation, The | 157 |
| Weinman Pump & Supply Co., The | * |
| Weirton Steel Corp. | * |
| Welding Equipment & Supply Co. | * |
| Wellman Bronze & Aluminum Co. | 137 |
| Wellman Engineering Co. | * |
| Wellman, S. K., Co. | 48 |
| Wells Manufacturing Co. | * |
| Wesson Co. | * |
| Westinghouse Electric & Mfg. Co. | 38, 39 |
| West Penn Machinery Co. | * |
| West Steel Casting Co. | 161 |
| Wheeling Steel Corporation | 159 |
| Whitcomb Locomotive Co., The | 32 |
| Whitehead Stamping Co. | * |
| Whitney Screw Corp. | * |
| Wickwire Brothers, Inc. | * |
| Wickwire Spencer Steel Co. | * |
| Williams, J. H., & Co. | 161 |
| Wilson, Lee, Engineering Co. | * |
| Wilson Welder and Metals Co., Inc. | * |
| Wisconsin Motor Corp. | * |
| Wolverine Tube Div., Calumet & Hecla Consolidated Copper Co. | * |
| Wood, R. D., Co. | * |
| Worthington Pump & Machinery Corp. | * |
| Worth Steel Co. | * |
| Wright Manufacturing Div., American Chain & Cable Co., Inc. | * |
| Wyckoff Drawn Steel Co. | * |

Y

| | |
|---|---|
| Yoder Co., The | 36 |
| Youngstown Alloy Casting Corp. | 40 |
| Youngstown Sheet & Tube Co., The | 25 |

Z

| | |
|---|---|
| Zeh & Hahnemann Co. | * |

Saved $19,000 in Power

Saved 200 Tons of Bearing Metals

Increased Production 375 Tons per day

Saved $4400 in Oiling Time

Saved $3260 on Lubricants

Eliminates Frequent Mill Adjustments

Saves Men —Prevents Accidents

# Farval . . . on Modern Soaking Pits and Blooming Mills

By injecting the grease directly between the bearing surfaces in exact quantities and at regular intervals, Farval maintains a proper film of lubricant at all times—giving a free-running mill—eliminating the need for frequent adjustments and permitting a faster and hotter rolling of steel.

Twenty-four hour operation leaves you no time margin for shutdowns—either to lubricate, or to repair if you *fail* to lubricate. To keep your "Steel for Victory" schedules rolling, you must keep your bearings rolling too.

Eliminate Mill delays—increase daily tonnages—*install Farval!*

*In Canada:*
PEACOCK BROTHERS LIMITED

**The Farval Corporation • 3270 East 80th Street, Cleveland, Ohio**

*Affiliate of The Cleveland Worm & Gear Company, Automotive and Industrial Worm Gearing*

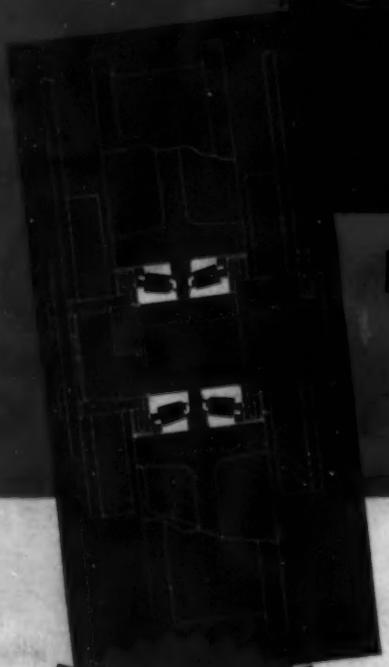
FARVAL

CENTRALIZED SYSTEMS OF LUBRICATION

Application of Timken Bearings in the wheels of modern soaking pit covers.

Timken Roll Neck Bearing application as used in blooming mills, slabbing mills and strip mills.

# Put TIMKEN BEARINGS in your Soaking Pit and Blooming Mill Equipment for Truly Modern Performance . .



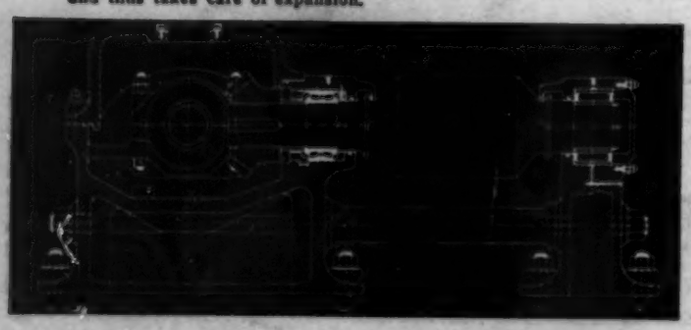
Don't wait to see what will happen after the war; begin to safeguard your future position now. Put your equipment in condition to meet any competitive challenge. Redesign to use Timken Bearings at every suitable position.

*New* equipment isn't necessarily *modern* equipment; *performance* is the test. This is true not only of soaking pits and blooming mills but of any kind of equipment.

Soaking pit covers and cover drives operate easier and faster and need less attention for lubrication and maintenance when Timken Tapered Roller Bearings are used at the points of friction and hard service. So do soaking pit cranes, crane tong controls and tong drives.

Likewise, on blooming and slabbing mill roll necks, screwdowns, drives and table rolls, Timken Bearings step up speed, promote operating accuracy and increase endurance. They have proved their worth in many of America's largest mills. For further information consult the equipment builder or our engineers. The Timken Roller Bearing Company, Canton, Ohio.

Timken Table Roll Bearing application. The use of a straight roller bearing at the opposite end permits the roll to float and thus takes care of expansion.



**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

**TAPERED ROLLER BEARINGS**

**"ALL THERE IS IN BEARINGS"**